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Research supporting social services to adapt to shocks

The effectiveness of the Sierra Leone health sector response to health shocks: Evidence from the COVID-19 perception survey

Philip S. Amara, Fredline A M'Cormack-Hale, Mohamed Kanu, Regina Bash-Taqi, and Alhassan Kanu

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Contacts

✉ maintains@opml.co.uk

Maintains Webpage

@MaintainsProg

www.linkedin.com/company/maintains/

Maintains is implemented through a consortium led by Oxford Policy Management Limited as the managing agent. Oxford Policy Management is registered in England: 3122495. Registered office: Clarendon House, Level 3, 52 Cornmarket Street, Oxford, OX1 3HJ, United Kingdom. www.opml.co.uk.

Executive summary

The objective of this study was to examine perceptions of how effectively the health sector responded to the Coronavirus Disease 2019 (COVID-19) pandemic, with a specific focus on leadership and governance, the health workforce, community ownership and participation, and service delivery.

We surveyed 303 Ministry of Health and Sanitation (MOHS) employees and stakeholders actively engaged with the COVID-19 outbreak response. The survey, conducted in October 2020, included both non-healthcare professionals and healthcare professionals. These were: (i) members of the COVID-19 response committees or pillars at national or district levels; and (ii) employees of non-health sector ministries, agencies, or non-government organisation partners working with the MOHS on implementing COVID-19 response activities. The sample was purposively selected from four strata: MOHS headquarter staff carrying out mainly administrative functions; MOHS healthcare professional or clinical staff working at government hospitals or peripheral health units (PHUs); District Health Management Teams (DHMTs); and other stakeholders at district and national level actively working with the MOHS on the COVID-19 response.

The sample was two-third males (67%), likely because there were more males than females in positions of responsibility in the COVID-19 response [22]. The mean age of the respondents was 42 years (standard deviation (SD) = 9.4), ranging from 22 to 64 years. About 36% of the respondents had a graduate degree, 24% had a postgraduate degree, 12% had a medical degree, while the rest had a nursing diploma or less. The distribution of the sample by district was even, with each district accounting for about 5% of the sample; the exception was Western Urban district sample, with 26% of the total sample, as this included the MOHS headquarter staff that made up a full stratum of the study sample, in addition to other stakeholders in Freetown selected for the study. Data analysis was conducted using SAS version 9.4.

The key findings of the survey are detailed under the relevant health system strengthening building blocks.

Leadership and governance

Effective governance of national emergencies requires legislatively mandated and adequately resourced national and sector focused structures to coordinate and respond to shocks. Experience from Ebola has facilitated the establishment of national and health sector emergency structures supported by response pillars and a high-level multi-sector committee to respond to health shocks. However, study findings show that the mechanisms for health emergency coordination including the linkages between the MOHS and other sectors deserve serious attention. The response to the pandemic was generally viewed as swift drawing heavily from learning from Ebola. However, the response is likely to flounder if there is a prolonged surge in cases due in part to systemic weaknesses in the governance of the health sector.

Approximately 87% of all respondents said the declaration of the state of emergency following the COVID-19 outbreak was timely (66%) or very timely (21%), and that there was an awareness campaign even before the first case was reported. This finding is corroborated by a study undertaken by MIT GOV/LAB, IGR, and other partners, conducted in April 2020,

early in the outbreak, which reported that among the 2,395 respondents in their nationally representative sample, 98% reported having heard of COVID-19, with 85% being aware of the COVID-19 117 hotline, both of which indicate a prompt awareness campaign in respect of the pandemic [50].

- Four out of five respondents said the **lessons learned from Ebola** were applied to the COVID-19 response. Key among these lessons are the need for proactive and decentralised leadership, resource mobilisation, active community engagement, media communication, active surveillance and case management, and effective logistics and supply chain management [54]. Nevertheless, findings from this survey and other studies show that not all lessons were fully applied [33]. Despite the proactive response, the pandemic spread quickly throughout the country. This subsequent spread was principally attributed to weak point of entry monitoring, inadequate funding, poor quarantine enforcement, and limited laboratory testing. Weak point of entry monitoring and poor quarantine enforcement were particularly noted by Freetown-based respondents; this is likely reflective of Freetown's status as a hotspot early in the outbreak, where there were concerns about identifying infected passengers and ensuring that passengers and affected households could be safely and effectively quarantined. Respondents mentioned complaints about insufficient supplies in quarantine homes as one of the problematic components of the COVID-19 response [36].
- There was a moderate level of confidence in the **leadership** of the MOHS regarding making the correct decisions to manage the pandemic. Overall, 68% of the respondents were extremely confident (15%) or very confident (53%) that the MOHS leadership would make the right decisions to manage the pandemic. Ironically, the main decision makers in the COVID-19 response were non-health professionals, and there was a low level of satisfaction among survey respondents with the way decisions about the COVID-19 response were made and carried out: only three out of five respondents (60%) were very satisfied or satisfied with decision-making and implementation. The study results indicate that the perception is that there was a top-down approach to decision-making, with leadership coming from the National Corona Virus Emergency Response Centre (NaCOVERC) at the central level, with the involvement of technical pillar heads.
- The **overall coordination of the response** to the COVID-19 pandemic between the MOHS, other emergency response agencies, and partners was regarded as weak. Less than 30% of respondents said the level of coordination was good, and only two out of five (41%) respondents said coordination of the COVID-19 response had improved compared to Ebola. Those outside of the MOHS were more than twice as likely to positively assess coordination levels than those within, perhaps indicating a low level of satisfaction within the ministry about the centrality of their role, the militarization of the response [36], poor coordination with district response structures [53] or the systemic fragmentation within the health sector [48].
- Considering the **overall management of the response**, 76% of all respondents said the government did an excellent or good job in handling the COVID-19 response, while 72% said the MOHS leadership did an excellent or a good job. These findings appear contradictory to the reported low level of satisfaction with how COVID-19-related decisions were made and implemented. A plausible explanation could be that in rating the government's overall management of the pandemic, participants may have taken into consideration the proactive policy measures implemented, which initially resulted in a low number of cases and a declining trend in cases at the time of the survey, despite the lapses

in the response. Additionally, the discrepancy could possibly be attributed to the perception that the response was militarized '. Fully understanding these contradictions will likely need further research [36, 53].

- Overall, two out of three respondents said the **emergency response plan** was followed very closely (13%) or somewhat closely (57%), while 76% of all respondents said there were plans in place to deal with a surge in COVID-19 cases. While there may be plans in place to manage a surge, rapid COVID-19 preparedness assessments revealed inadequate capacity to respond to a surge or to sustain service delivery during a sustained surge [31, 39].

Health workforce

The health workforce lacks surge capacity to respond to the pandemic and maintain service delivery. Inadequate training, poor incentives, and perceptions that the MOHS leadership is unlikely to deploy response staff based on merit were among the main concerns expressed by respondents, particularly female respondents.

- The survey results show that the national **human resource capacity** to respond to the pandemic was regarded as weak. Only two out of five (42%) respondents said all frontline workers were trained in the COVID-19 emergency response, which is indicative of a sense of weak preparedness for managing a surge in cases. MOHS respondents (46%) were more likely to say there was adequate national human resource capacity to respond to the COVID-19 pandemic compared to non-MOHS respondents (30%). Female respondents, on the other hand, were more likely to be dissatisfied with existing human resource capacity. This suggests that while the ministry respondents were more likely to rate their capacity more favourably, women, who form the front line of the fight against the epidemic as hospital staff, were concerned about training levels.
- Although a high level of respondents (80%) said they were **adequately involved** in the COVID-19 response, a significantly lower ($p = 0.002$) percentage of females (69%) than males (85%) reported that they were as adequately involved in the response as they would expect to be, based on their roles.
- Overall, only three out of five respondents (58%) expressed confidence in the MOHS to **select and deploy COVID-19 response staff based on merit**. Females (54%) were less confident than males (60%) that the MOHS would fairly select and deploy staff for the response.
- Three out of five respondents (75%) whose primary work location was a health facility were extremely worried or very worried about being infected with COVID-19, mainly due to the irregular supply of personal protective equipment (PPE). Interestingly, there was no difference by gender. These findings are supported by other studies. Data from these studies found that health care workers were concerned about **health facility preparedness** to handle the epidemic, and about the availability of equipment to keep them safe as they handled outbreak cases [31, 39, 52].
- Delays in the payment of salaries and other incentives, inadequate incentives, inadequate training, inadequate logistics, medical supplies and equipment, inadequate drugs, and lack of transportation were identified as the main **challenges to the effectiveness of the health workforce** in responding to the pandemic. Health workers have gone on strike since the pandemic began, often over delayed hazard pay, as well as lack of PPE.

Community ownership and participation

Study findings show some level of community-oriented focus to the COVID-19 national emergency response, a critical learning from the Ebola response. However, community involvement was predominantly related to risk communication to improve community awareness of potential risks and provide information on protective behaviours. Respondents called for strengthening community engagement, the inclusion of community leaders, women and youth, the development of community-level by-laws (as well as enforcement of the same) and greater decentralisation of the response, with more resources and tools provided at the community level.

- There was a perception among the respondents of a relatively high level of **community involvement** in the response compared to Ebola. The estimated community involvement score in the COVID-19 response, as measured on a four-point scale, was 2.9 (SD =1.17); [less involved =1 to more involved=4].
- Respondents believed that there were inadequate **contact tracers** in some communities to respond to a surge in cases. Only 66% of all respondents said there were adequate contact tracers at the district level. Community health workers (CHWs) were mainly assigned to conduct contact tracing, but not all were trained. Overall, 31% of respondents said all CHWs were trained, while 60% said that only some were trained.
- Three out of four respondents (75%) said the MOHS's efforts to **work with community leaders** on the response were either very satisfactory or satisfactory. A higher proportion of males (77%) than females (69%) indicated either a very satisfactory or a satisfactory assessment of the ministry's efforts to engage community leaders, suggesting another avenue of women's marginalisation in the fight against COVID-19. Further, it is important to note that in open-ended responses about challenges in addressing the outbreak, respondents mentioned the need for greater community engagement, involvement, and ownership in the response, suggesting that community engagement efforts were not necessarily very robust. Others, like Grieco (2020) and Grieco and Yusuf (2020), have also suggested that community engagement needed deepening [36, 38].

Service delivery

The health sector capacity to mount a clinical and public health response to the COVID-19 pandemic was stretched. However, it is likely that respondents reported that essential service delivery functions were maintained because there was a rapid drop in cases following a sharp rise and a campaign to improve service utilization. Although respondents perceived the health sector to be more prepared than during Ebola, the reported lack of triage and functioning infection prevention control in most health facilities and shortages of medical logistics imply that the sector was inadequately prepared to manage a prolonged surge in cases.

- The **effect of the pandemic on primary and tertiary health service delivery** was viewed as moderate. Less than half of all respondents (46%) said COVID-19 had had a major effect on primary health service delivery; approximately 41% said it had had a moderate effect. When compared to Ebola, three out of four (79%) respondents said the COVID-19

pandemic had had less effect on service delivery compared to Ebola. The mean score on the perceived capacity of the MOHS to maintain essential health service delivery was 3.8 (n=303, SD=0.63), measured on a five-point scale. This translates to a 76% capacity rating on a percentage scale. The evidence on the perceived capacity of the MOHS to maintain essential service delivery during the pandemic appears mixed. There were early reports about drops in healthcare utilisation due to fears of contracting COVID-19, as well as health workers refusing to come to work due to similar concerns [41, 50]. Relatedly, a UNFPA (2020) study found that healthcare workers expressed concerns that patients were avoiding hospitals due to fear of contracting COVID-19, but the study did not find this supported by attendance data, specifically on maternal health and family planning, although it noted the importance of monitoring the data to note if challenges might emerge [39]. Other studies suggest that early declines in health facility attendance were reversed following sensitisation campaigns [41, 59, 56].

- Most respondents felt that the health system was better prepared for COVID-19 than it was for Ebola, and that the government – along with the MOHS – took **proactive measures early in the pandemic** that resulted in less cases and deaths. They pointed to the building of awareness around COVID-19, and preventive measures such as the ban on international travel, as well as established structures that were put in place even before the outbreak occurred.
- However, **surge capacity was regarded as inadequate**. Only two out of five respondents (41%) said there were adequate treatment and isolation facilities available to manage a surge in COVID-19 cases to the level of the Ebola epidemic. A UNFPA study conducted early in the outbreak (April–May 2020) that assessed 14 urban and peri-urban hospital and community health centres noted that while PPE, triage, and isolation facilities were available in selected hospitals, the same were not available in many community health centres included in the study [39].
- The challenges to the health system that affected the effectiveness of service delivery during the COVID-19 response were systemic. **Supply chain management problems**, particularly irregular supply of drugs, infection prevention and control (IPC) materials, and essential laboratory test supplies, were among the most often mentioned problems that respondents believed undermined the effectiveness of the response. Disruptions in global supply chains very likely compounded these issues also.

Conclusions and policy implications

The study results indicate that the health sector was generally perceived by the survey respondents to have maintained its service delivery functions during the pandemic, although there were earlier reports of a decline in service delivery. The MOHS and the Government of Sierra Leone were said to have done a good job handling the response, but it was reported that a lot more could have been done across all health system pillars to manage the response even more effectively and to ensure essential services were more responsive and adaptive to the health shock.

In regard to developing a more resilient health system, the study results point to a need for a systems approach to health system strengthening that addresses identified gaps under all pillars, with priority given to service delivery, human resources for health, and drugs and medical supplies. The results indicate that one of the main challenges to effective service

delivery during the COVID-19 response was an inadequately trained and demotivated health workforce. These findings are consistent with previous studies that confirm that inadequate health workforce training is a perennial problem within the Sierra Leone health system [16]. There is a need for comprehensive, well resourced, need-based, and harmonised health workforce **training** (pre-service and in-service) and education programmes that cater to the different competencies required to respond to emergencies and to ensure continuity of care. It is imperative to rethink current approaches to health workforce training to ensure that training is available on a continuous basis to as many as possible, and that it is practical and supportive of staff's service delivery functions. Consideration could be given to implementing a health sector-wide clinical mentorship programme like the initiatives being supported by health implementing partners under the Saving Lives in Sierra Leone Programme. Health workforce training deserves attention because the study respondents suggested that resilience to health shocks could be enhanced if there was a trained and motivated health workforce that was provided with the necessary materials to effectively deliver essential health services and respond to health emergencies. Particular attention should be paid to developing and implementing an appropriate employee **compensation** strategy that is affordable but also competitive, to attract and maintain a workforce comprising the clinicians, public health professionals, and CHWs needed for the prevention, detection, mitigation, and response to public health emergencies and the delivery of essential health services. Employee compensation should be responsive to the overarching concerns about the adequacy and timeliness of compensation. Merit-based **recruitment**, with clear criteria and processes for recruitment, are also important, given concerns about politically motivated appointments.

Although the overall **supply chain and cold chain management** has improved over recent years, with significant donor support, the study participants identified persistent supply chain management challenges that undermined the effective provision of essential health services and the overall response to the pandemic. The survey results point to the need for healthcare facilities to be provided with adequate medical equipment and pharmaceutical supplies to be able to provide essential health services and to respond to emergencies. This is particularly important because a resilient health system should have the capacity to procure, store, transport, and distribute supplies quickly to avoid inordinate delays [26].

Data were disaggregated and analysed by subgroups to identify **differing and common views** among subgroups. Few statistically significant differences in perceptions were found. Perceptions about the timeliness of the COVID-19 response were generally favourable but there were differences in these perceptions when comparing district respondents with Freetown respondents. District participants were less likely than Freetown participants to consider the response as very timely, perhaps reflecting the initial focus on Freetown as the pandemic hotspot. Respondents external to the MOHS had a more positive view of the extent of coordination between the MOHS and NaCOVERC than respondents who were employees of the ministry. There was a level of dissatisfaction among MOHS staff about their involvement in the response: many felt side-lined by the involvement of NaCOVERC and perceived the level of coordination with that body and the MOHS as weak. Additionally, junior staff had a less favourable judgement of the COVID-19 response than senior staff, indicating a perceived level of marginalisation among this group. Junior staff were less confident than senior staff that the MOHS leadership would make COVID-19 deployment based on merit.

The results also show that **women** were less likely to be involved overall in the COVID-19 response. For example, there were fewer women members of COVID-19 coordinating

committees than males. Women were more likely than males to express feelings of marginalisation, stating that they were not as actively involved in the COVID-19 response as they expected to be based on their roles, and were less likely to believe that appointments would be merit-based. Women were also less likely to be satisfied with MOHS efforts to work with community groups. The study findings reflect the inadequate inclusion of women in all aspects of development, and the ingrained gender disparities in Sierra Leone.

The study findings point to the need for stronger **coordination** of the ongoing COVID-19 response by the MOHS, and greater involvement of the professional health workforce, particularly females, especially at leadership and decision-making levels [57]. The coordination structures currently in place to ensure all stakeholders are working in sync with the national response priorities need to be strengthened, both at national and district levels, including active community participation in the response.

There is also a need for stronger collaboration, and commitment, on the part of government and partners to ensure the provision of adequate **resources** to support the implementation of health programmes, particularly interventions related to service delivery, drugs and medical supplies, and human resources for health. A weak and under-resourced health sector was cited as one of the principal reasons the Ebola outbreak spiralled in the way that it did. Despite calls for comprehensive health system strengthening in the aftermath of Ebola, the health sector remains poorly supported. There is a need for greater financial investment in the health sector to prevent the health system from floundering in the face of health [33].

The current study was originally planned to form part of a larger study involving four case studies and desk reviews, designed to assess how effectively the Sierra Leone health sector has responded to past and current shocks. The larger study has now been discontinued, due to the withdrawal of funding. This report largely reflects the perceptions of service delivery and coordination by stakeholders engaged in the response, which are subject to bias. Thus, caution must be exercised in drawing conclusions regarding the overall quality of the COVID-19 response.

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List of abbreviations

CHW	Community Health Worker
COVID-19	Coronavirus Disease 2019
DHMT	District Health Management Team
DiCOVERC	District Coronavirus Disease Emergency Response Centre
IPC	Infection prevention and control
MOHS	Ministry of Health and Sanitation
NaCOVERC	National Coronavirus Disease Emergency Response Centre
PHU	Peripheral Health Unit
PPE	Personal protective equipment
SD	Standard deviation
UNFPA	United Nations Population Fund
WHO	World Health Organization

1 Background

Sierra Leone is a shock-prone developing country. In addition to civil war, the country has experienced several disease outbreaks and catastrophic events over the past decades that have stretched the ill-equipped health system to its limits and that have resulted in suffering and deaths [1, 2]. The size and persistence of these outbreaks has varied from a few confirmed cases in localised areas to more generalised outbreaks of international concern [2]. Disease outbreaks have included dysentery (2000), yellow fever (2003, 2009, and 2011), cholera (1994–95, 2012), measles (2009–10, 2018–19), Lassa fever (2004, 2016, 2017, 2018, and 2019) [3, 4], Ebola (2014–2016), and the COVID-19 pandemic (2020 to present). All of these outbreaks resulted in varying levels of suffering and death. For example, the cholera outbreak in 1994–95 resulted in 46,061 confirmed or suspected cases and 1,465 deaths. The measles outbreak of November 2009 to July 2010 infected 1,094 persons and led to nine deaths [5]. Cholera re-emerged in 2012–13, with 23,308 confirmed or suspected cases and 301 deaths. The Ebola outbreak in 2014–16 infected 14,124 persons, of which 8,706 were laboratory-confirmed cases, and caused 3,956 deaths [6]. About 350 healthcare workers were affected, with 221 deaths reported among them. It was estimated that 5,600 children lost at least one parent due to Ebola [7]. The disruptions to essential vaccination programmes during the epidemic, and previous sub-optimal vaccination coverage, contributed to outbreaks of measles, with 4,970 cases reported to the World Health Organization (WHO) from 2014 to 2019 [8]. Lassa fever is also endemic to Sierra Leone and its incidence has been rising significantly in the past few years [2].

As at 22 May 2021, since the first case of COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-Cov-2) was reported in Wuhan, China, in December 2019, over 163 million people worldwide had been infected with the virus and the disease had caused over 3.4 million deaths in 191 countries and territories, with these figures continuing to rise [9]. Learning from the Ebola experience, Sierra Leone moved swiftly to put in place precautionary measures, such as point of entry monitoring and quarantining of international visitors arriving from hot spots. Nevertheless, the first case was reported on 30 March 2020 and the virus spread quickly throughout the country. The government continued to issue a range of guidelines and restrictions, including the wearing of facemasks, regular hand-washing, a curfew, and an inter-district travel ban, among many other regulations [38]. A one-year state of emergency was also declared on 16 March 2020. However, many of these measures have since been relaxed as cases are now relatively low. The state of emergency was lifted in March 2021, and travel restrictions (both national and international) have been lifted, along with the nationwide curfew and ban on congregational worship, among other measures, although social distancing and mask-wearing protocols remain in place [55]. As at 26 May 2021, 4,130 confirmed COVID-19 cases had been reported, with 3,127 recoveries and 79 deaths [10].

Sierra Leone is vulnerable to flooding, windstorms, landslides, and coastal erosion. In the past 15 years at least four major floods have affected more than 220,000 people. The most severe in recent years have been in 2015 and 2017 [4]. In September 2015, massive floods caused by torrential rains hit the capital, Freetown, and caused serious damage, particularly for people living in informal settlements. The floods left more than 3,000 people displaced in Freetown and damaged a few water points and sanitation facilities. In August 2017 a major landslide

occurred in Regent, Freetown, which directly affected approximately 6,000 people, of whom 1,141 were declared dead or missing [4].

All of these shocks affected the coverage of, access to, and utilisation of health services, with major impacts on health outcomes. In addition to the loss of life, these health shocks resulted in massive disruptions to activities, not only in the health sector but in all sectors, including social and economic sectors of the economy. The highlighted consequences of repeated health shocks for an already weak health system lend credence to the need for developing a resilient health system that can maintain essential health services during a shock, or that can bounce back better after a health shock.

While outbreaks of international concern, such as Ebola or COVID-19, receive sustained international attention and funding following a declaration of a state of emergency, localised outbreaks like cholera or measles do not receive similar attention, so the country is required to self-manage them. There are important lessons that may be learned from the health system's response to these shocks that provide evidence that will be of use in developing a resilient health system. However, up to now, little is known about how effectively the health sector responds to health shocks, particularly the mid-sized shocks that the country self-manages.

Most studies that have assessed health system performance during health shocks in Sierra Leone have focused on coping with conflict-related health shocks, or have been specific to Ebola, or have been localised to a few districts, or have been designed to assess the impact on specific services or diseases [11–16]. A few studies have investigated the incidence or impact of specific shocks, such as cholera [17, 18], measles [19], Lassa fever [20], or the recent mudslides [21]. Nevertheless, there is a dearth of studies specific to the Sierra Leone health sector on sustainable ways in which the health system can cope with health shocks while maintaining essential health services.

The Maintains research programme has been designed to fill the gap in knowledge on sustainable interventions that will help to build shock-responsive social systems that can scale up and down in the face of shocks. In Sierra Leone, the focus is on the health system and this focus has been conceptualised around mid-size shocks that are funded and managed with government and local donor resources, with limited additional external resources beyond that provided by local partners. The research programme has several work packages, looking at preparedness, response, crisis levels of care, and other aspects.

Maintains is committed to considering the gender equality and social inclusion aspects of shock response, and this is particularly important in this study. Women account for the largest proportion of the Sierra Leone health workforce in the lower and middle cadres; few women are in management positions when compared to their overall numbers in the health workforce [22]. These gender imbalances have been attributed to several factors [22, 23]: they are inherent in household power dynamics, in land rights, sociocultural attitudes and practices, and in the educational system. For example, nursing school graduates in Sierra Leone are predominantly female, probably because sociocultural barriers discourage men from entering the nursing or midwifery professions. Life-course events also present disproportionate barriers to women's progression in the health workforce [24]. The dominance of men in decision-making has not always resulted in the equitable and fair distribution of opportunities, or a robust response to outbreaks.

This study is part of the Maintains research programme that is considering health sector response, which looks in detail at four health shocks to explore how effectively the health sector responded, and which seeks to document lessons learned that could be applied to help develop resilience to future shocks [4].

The COVID-19 pandemic was one of the four health shocks selected for review. This study has provided the opportunity to observe the response to the COVID-19 pandemic in real time, and to capture the perceptions of actors, including on the coordination of efforts among the actors involved, as well as capturing lessons learned on how effectively the health sector has responded to the pandemic [2].

Although this study was intended to be one of several workstreams, the early closure of the Maintains programme has meant that COVID-19 is the only health shock that was able to be reviewed.

The objective of the survey was to examine the perceptions of the health workers employed by the Sierra Leone MOHS, as well as stakeholders actively working with the ministry on the response, to evaluate how the health sector responded to the COVID-19 outbreak, with a specific focus on service delivery, leadership and governance, the health workforce, and community ownership and participation. These four building blocks were selected for the study because experience from Ebola has indicated their critical importance to an effective response. The study was designed to identify specific challenges in each of these building blocks that contributed to the spread of COVID-19, and to document lessons learned. A systematic study of how the health system responded to previous health shocks will provide the knowledge base necessary to design programmes that will help the sector manage new demands from shocks while maintaining essential health services.

1.1 Materials and methods

We assessed the perceptions of health workers employed by the MOHS and stakeholders engaged with the COVID-19 response. We defined stakeholders as non-healthcare or healthcare professionals. These were: (i) members of the COVID-19 response committees or pillars at national or district levels; and (ii) employees of non-health sector ministries, agencies, or partners from non-governmental organisations working with the MOHS on implementing COVID-19 response activities.

1.2 Sampling

We divided the population into four strata, defined as follows:

- MOHS headquarter staff: all professional staff performing non-healthcare roles, which includes directors, division heads, programmes managers and supervisors, and support staff.
- MOHS healthcare professional or clinical staff working at government hospitals or PHUs.
- DHMTs: MOHS staff performing non-healthcare roles at the district level.
- Other stakeholders at district and national level actively working with the MOHS on the COVID-19 response, including serving as members of national or district response committees.

The planned sample was an equal sample of 75 respondents purposively selected in each stratum to achieve representativeness as much as was practical. We excluded health workers and non-health workers not directly involved with the COVID-19 response.

1.3 Data collection and quality assurance

Data collectors were trained remotely over a two-day period using 2.5-hour Zoom sessions. They were trained on how to select the sample using the stratification procedures mentioned in Section 1.2, and on how to select an equal number of respondents in each district, except in Western Urban area, which includes Freetown. However, a supervisor selected the sample and provided guidance on who was interviewed in each district. Training included a discussion of the questions to ensure data collectors had a common understanding of the question wording and meaning.

We administered a questionnaire with a mix of quantitative close-ended questions and qualitative open-ended questions to solicit the perceptions of the respondents on how effectively the health sector had responded to the pandemic. The study variables that informed the questionnaire design are shown in Table 1. The survey was conducted in October 2020, when the country had attained a low level of COVID-19 risk following a peak in May and June. Data were collected from 303 respondents using computer-assisted interviewing, with the survey programmed on electronic devices using Kobo Collect software. The programmer who designed the forms managed the database, including providing data quality assurance. The data collected were automatically available online for edit and the Kobo Collect viewing and analysing features were used to provide updates on progress, to check the quality of the data, and to provide immediate feedback through the field supervisor where necessary. Preliminary tables were created for key variables at various stages of data collection using the software, which allowed for validation of the data collected.

1.4 Study variables

The study was designed to examine how effectively the health sector had responded to the COVID-19 pandemic, with a focus on leadership and governance, the health workforce, community ownership and participation, and service delivery. The study variables are shown in Table 1.

Table 1: Measures of how effectively the health sector responded to COVID-19 based on the MOHS perception survey

Main Component	Measure	Indicators
Leadership and governance	Timing of response	% of senior staff who think response was delayed
	Reasons for spread	% distribution of perceptions on reasons for the spread of the COVID-19 pandemic in the whole country
	Confidence in MOHS response	% of staff who express confidence in the MOHS leadership to manage the response

	Decision-making	% of staff who express satisfaction with the COVID-19 response decision-making process
	Coordination	% of staff who said MOHS is doing a good job coordinating the partner response to the pandemic
		% of staff who said coordination has improved during COVID-19 compared to Ebola
		% of staff who said the government is doing a good job responding to the pandemic
		% of staff who said the MOHS leadership is doing a good job coordinating the COVID response
		% of staff who said the COVID-19 response (pillar and governance structures) are following plans laid out for emergency response/ epidemic management and preparedness
	District-level Committees	% of district staff who said that district COVID-19 committees are functional
		% of district staff who said that district COVID-19 committees are effective
	Surge planning	% of senior staff who think there is a plan to address a COVID-19 surge to Ebola case levels
Health workforce	Training	% of staff who said all frontline workers have been trained
	Human resources capacity	Staff rating of human resource capacity to respond to emergencies
	Staff involvement	% staff that said they were less involved in the COVID-19 response than they should have been based on their role.
		% of staff that said MOHS is fair in the deployment of staff to the COVID-19 response
	Personal impact of COVID-19	% of staff that were worried about the personal impact of COVID-19
	Challenges to human resources	Staff perception on human resource challenges to the COVID-19 response
Community ownership and participation	Community involvement	% of staff who said communities are more involved in the COVID-19 response than during Ebola
	Community contact tracing	% of district staff who said there are adequate contact tracers in districts

	CHW involvement	% of district staff who said CHWs are trained/ adequately involved in the COVID-19 response
	MOHS community engagement	% of district staff who are satisfied with MOHS engagement with CHWs
	Community response	Perceptions on what should change to improve effectiveness of community response
Service delivery	COVID-19 effect on service delivery	Respondent rating of the effect of the COVID-19 pandemic on service delivery at PHUs
		Respondent perceptions on the effect of the COVID-19 pandemic on the provision of health services at district and regional hospitals
		% of respondents that said COVID-19 had less, the same, or more effect on service delivery compared to Ebola
	MOHS capacity to maintain service delivery during pandemic	Respondents' rating of the capacity of the MOHS to maintain service delivery at PHUs during the COVID-19 pandemic
	Isolation and treatment of COVID cases	% of respondents that said there are adequate facilities to isolate and treat current COVID-19 suspected or confirmed cases
	Surge capacity	% of respondents that said there is adequate capacity to deal with an increase in COVID-19 suspected or confirmed cases
Health system strengthening	Priority interventions	Suggested priority health system strengthening building blocks and interventions

1.5 Statistical analysis

Simple descriptive methods and chi square tests were used to analyse the data with SAS software version 9.4.[1] Missing data analysis revealed no pattern of missingness, with item non-response and missingness less than 1%. We employed complete case analysis to generate frequency tables, with no imputation of missing data.

Analysis was done by gender, age, duty station (health facility vs non-health facility), location (district/DHMT vs Freetown), employment status (MOHS permanent staff, MOHS temporary staff, and non-MOHS respondents), and for the permanent staff by salary grades (Table 2). The classification of permanent staff into various salary grades was informed by the Government of Sierra Leone's revised civil service regulations [25]. We classified staff into three levels as follows: junior staff from Grades 1 to 6; supervisory staff from Grades 7 to 9; and senior staff from Grades 10 and above. This was necessary to deep dive into the data to

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identify differing and common views among various subgroups where appropriate. The results are presented mainly in the form of graphs, with few tables.

Two research assistants coded the open-ended responses, guided by a coding scheme prepared by the research team. A senior researcher with expertise in qualitative data analyses verified the coding and content-analysed the data.

1.6 Ethical considerations

The Sierra Leone Ethics and Scientific Review Committee approved the study, including the consent procedures. The purpose of the study, how participants were selected, the duration of the study, potential benefits and costs, and provisions for ensuring the confidentiality of information provided (including the right to withdraw or refuse to answer any question) were explained to participants. Participants were given the opportunity to ask questions and to consent voluntarily to participate in the study by signing a consent certificate.

1.7 Limitations

The study relies on individual perceptions, which are subject to mistakes, illusions, and biases. The data may be subject to acquiescence bias because the prevailing workplace culture in Sierra Leone is for subordinates to give in or stay silent even in the face of unsatisfactory outcomes or work conditions. The study has utilised a non-probability sample and is limited to MOHS staff and other stakeholders actively involved with the COVID-19 response, which limits the generalisability of our study findings. To address some of the concerns, we have employed a systematic process of sample selection by dividing the study population into strata and purposely selecting respondents that were reasonably well informed about the current state of the emergency response. We have ensured that the opinions of the key stakeholders in all districts are represented.

The study is descriptive research and is not designed to statistically verify the research questions or attribute causes to reported behaviours. Nevertheless, the design allows us to utilise both qualitative and quantitative methods to throw light on the Sierra Leone health sector response to the COVID-19 pandemic.

The current study is part of a larger study (one of four case studies) designed to assess how effectively the health sector has responded to past and current shocks. The review of the four cases studies (the other proposed studies were measles in Kambia, mudslides in Western Area, and flooding in Tombo) was originally intended to be followed by a resilience system analysis to elucidate further the most critical capacity gaps and to document the current areas of good practice and innovation [4]. Thus, this report on its own does not provide the full picture of how effectively the health system is currently responding to health shocks. Despite the limitations, we have reviewed the extant literature to verify some of our conclusions using secondary data.

2 Results

2.1 Characteristics of the study population

The proportion of males (67%) in the overall sample (n=303) was higher than that of females, likely because there were more males than females in positions of responsibility in the COVID-19 response (Table 2). However, we purposively included as many MOHS females at the higher grades involved with the COVID-19 response as possible. MOHS respondents, including the temporary staff, represented 86% of the sample, while non-MOHS respondents accounted for 14% of the sample (Table 2). When classified by location of the respondents, 30.7% of the sample included Freetown respondents working at the MOHS or other partners working in Freetown, while 69.3% were working in districts, either at the DHMT, health facilities, or as stakeholders on the district response committees (i.e. district/DHMT sample).

Table 2: Distribution of the achieved sample for the MOHS COVID perception survey (n=303)

Variable	Level	Gender		Total
		Males	Females	
Salary grade (civil servants)	Grades 1 to 6	42	35	77
	Grades 7 to 9	54	43	97
	Grade 10+	45	8	53
Total		**141**	**86**	**227**
Age in years	21–34	50	21	71
	35–49	108	53	161
	50+	45	26	71
Total		**203**	**100**	**303**
Employment status	Permanent	142	85	227
	Temporary	30	3	33
	Non-MOHS	31	12	43
Total		**203**	**100**	**303**
Location	Freetown	69	24	93
	District/DHMT	134	76	210
Total		**203**	**100**	**303**
Duty station	Health facility	63	55	118
	Non-health facility	140	45	185
Total		**203**	**100**	**303**

The mean age of the respondents was 42 years (M=303, SD= 9.4), with a range from 22 to 64 years. About 36% of the respondents (n=303) had a graduate degree, 24% had a

postgraduate degree, 12% had a medical degree, while the rest had a nursing diploma or less as their highest level of education attained. Overall, the sample was representative of the age distribution of the MOHS health workforce.

Although there were more males than females, the sample was representative of the gender distribution of the permanent MOHS staff on the government payroll (also called pin-coded staff) in positions of responsibility in the response. The sample was disproportionately male because we were interested in interviewing people who were engaged with the COVID-19 response and more males than females oversaw the response. When compared across the various salary grades, there were 51% males and 49% females in the population (N= 9,778), compared to the sample (n=303) proportion of 62% and 38%, respectively.

We selected an equal number of respondents in each district except in Western Urban area, which includes Freetown. The achieved sample was 303, slightly higher than planned, due to a deliberate attempt to include more females. The distribution of the achieved sample (Table 3) was also slightly different from our planned sample on the stratification variables described above. However, it reflects the distribution of the MOHS population in regard to age, salary grades, and gender.

Table 3: Distribution of the sample by district (n=303)

District	Count	Percent (%)
Bo	15	5
Bombali	15	5
Bonthe	15	5
Falaba	15	5
Kailahun	16	5
Kambia	16	5
Karene	13	4
Kenema	14	5
Koinadugu	15	5
Kono	15	5
Moyamba	16	5
Port Loko	15	5
Pujehun	15	5
Tonkolili	15	5
Western Area Rural	15	5
Western Area Urban	78	26

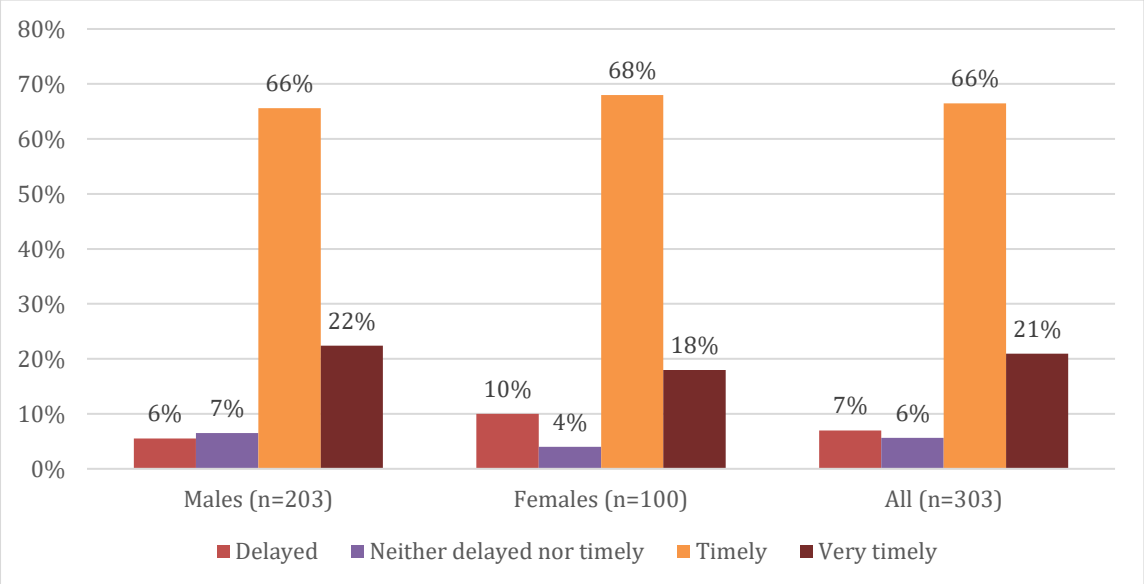
2.2 Leadership and governance

Leadership is a cross-cutting component of an effective response to health crises. The best preparedness plan will fail without appropriate leadership to turn the plan into swift actions and to galvanise the population, and without the crises management structures to respond favourably to the demands of the situation. Leadership is required to trigger the response through a state of emergency and to ensure that the predefined roles and responsibilities of crisis management agencies and individuals during an emergency are implemented and laws are followed. Leadership is required for effective coordination of the response, the operations of emergency response institutions at national and community level (including relief agencies), the entry of foreign health workers to help with the response, linkages with other sectors, and financing of the health emergency. The health workforce and the general population need to have confidence and trust in the leadership of the health system, including the decision-making process, in order to ensure its effectiveness. Additionally, the leadership should have the necessary resources and capacity to turn health emergency laws, policies, and decisions into action. Thus, one of the aims of this study was to examine health workers' perceptions on how the leadership functions of decision-making and coordination were carried out, and on the leadership-related challenges that affected the response [26].

2.2.1 How would you describe the timeliness of the COVID-19 declaration of the state of emergency?

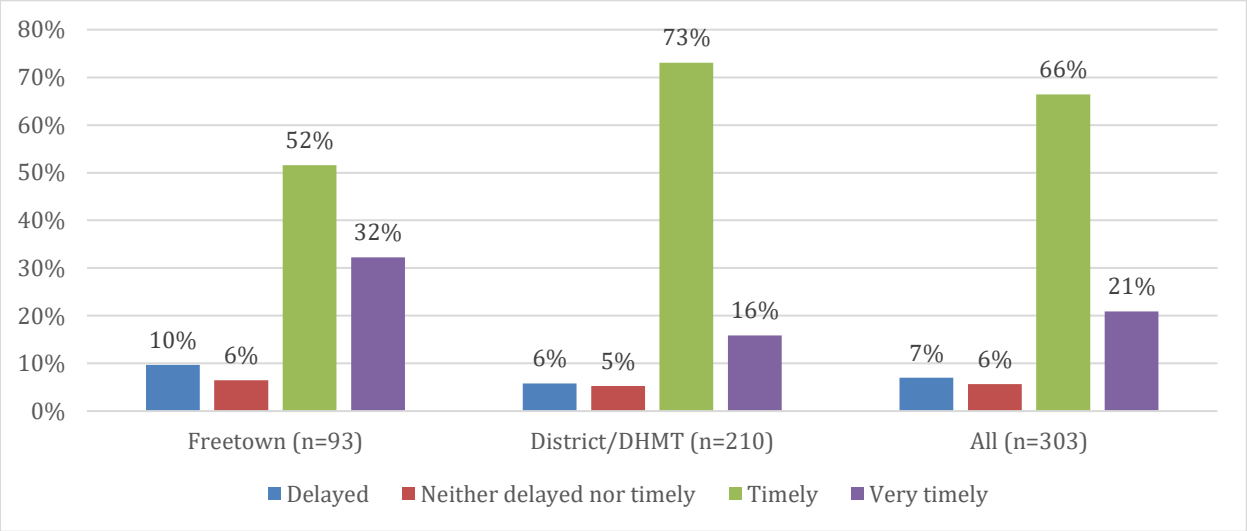
There was a high level of agreement among respondents – even when disaggregated by subgroups –that the declaration of the state of emergency following the COVID-19 outbreak was timely. Approximately 87% of all respondents (n=303) said the declaration of the state of emergency following the COVID-19 outbreak was timely (66%) or very timely (21%). There were no differences between males (88%) and females (86%) in their perception of the timeliness of the declaration (Figure 1).

Figure 1: Timeliness of the declaration of a state of emergency following COVID-19 outbreak, by gender



There were statistically noticeable differences between Freetown (n=93) and district (n=210) respondents in their perceptions of the timeliness of the response (p = 0.003). Although overall more district respondents considered the response as very timely or timely (89%) compared to Freetown respondents (84%), Freetown respondents (32%) were twice as likely as district respondents (16%) to state that the response was very timely. Emergency response decision-making and the allocation of resources to implement decisions are centralised in Freetown. Although only one in 10 respondents said the response was delayed (Figure 2), the difference in the degree of perceived timelines between Freetown and district respondents may be suggestive of the delay in the implementation of emergency response decisions at district level.

Figure 2: Timeliness of the declaration of a state of emergency following a COVID-19 outbreak, by location

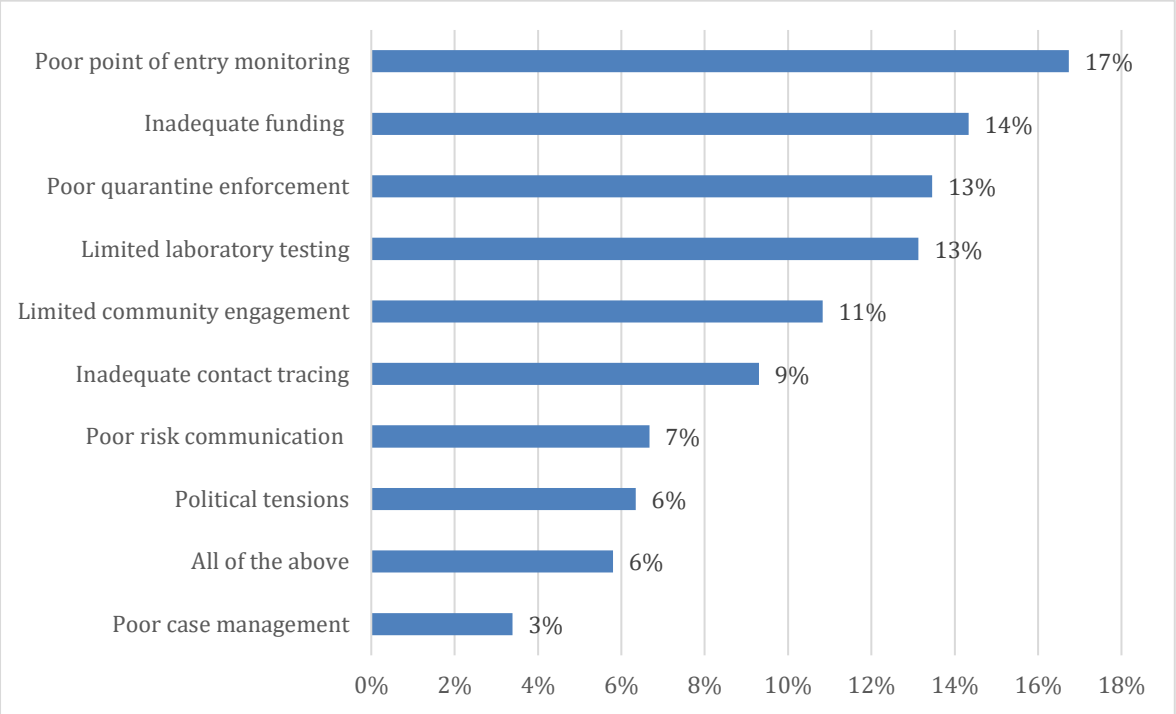


There were no statistically detectable differences between health facility (89%; n=118) and non-health facility (88%; n=185) respondents on the timeliness of the declaration of the state of emergency. Health facility respondents were those who stated that their primary work location was a health facility. When analysed by the permanent (pin-coded) respondents of the MOHS, about 88% of the senior staff (i.e. staff at Grades 10 and above in the civil service salary ranking; n=53) said the declaration was very timely or timely. The percentage of junior staff (that is, staff at Grade 6 and below) that said the response was very timely or timely was higher (91%; n=77), but there were no statistically discernible differences among grades.

2.2.2 What do you think are the challenges that are responsible for the spread of the pandemic in the country?

We asked respondents what they thought were the challenges that were most responsible for the spread of the disease despite the relatively proactive measures put in place at the start of the outbreak. Respondents were asked to select responses from a pre-determined list, and were able to choose all listed options if they thought this was appropriate. The responses were ranked based on the number of times they were selected by the respondents. The rankings are shown in Figure 3.

Figure 3: Main challenges that contributed to the spread of COVID-19 in Sierra Leone (total number of times issues were mentioned= 914; n=303)

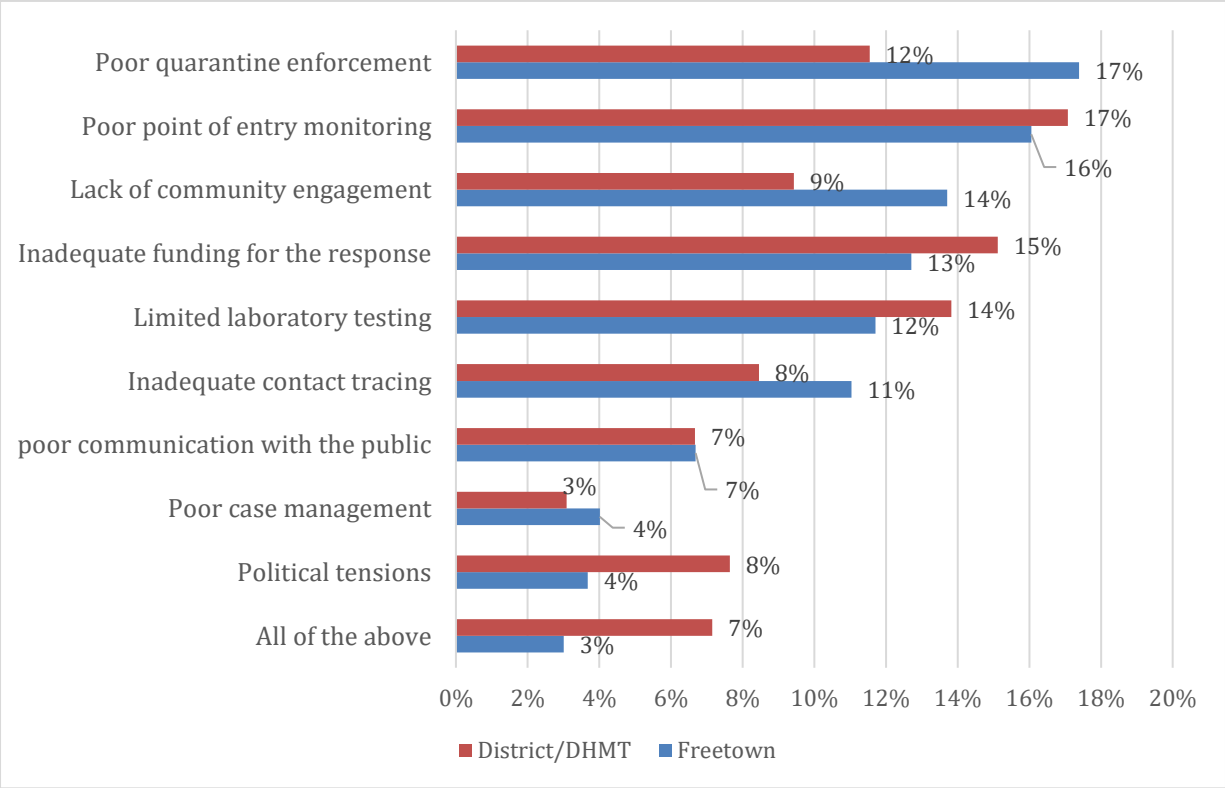


The top four ranked challenges were: (i) point of entry monitoring; (ii) inadequate funding; (iii) poor quarantine enforcement; and (iv) limited laboratory testing. When classified by gender, point of entry monitoring, inadequate funding, poor quarantine enforcement, and limited laboratory testing remained the top four challenges that were deemed by both men and women to have contributed to the spread of the pandemic, although females ranked quarantine enforcement higher than laboratory testing.

Among the senior staff of the MOHS (Grade 10 and above), inadequate funding, poor quarantine enforcement, and limited laboratory testing capacity were the top three ranked challenges, followed by 'all of the above'. MOHS staff below Grade 10 ranked point of entry monitoring as the primary reason for the spread of the pandemic and were more likely to regard the challenges as involving all the issues listed than the higher-level administrative or professional executives. We divided the sample into respondents that identified as permanent or temporary staff and those that were non-MOHS staff and ranked their choices. The aim here was to identify differences in opinions (if any) between MOHS and non-MOHS respondents on the challenges that contributed to the spread of the pandemic. The four top-ranked challenges (point of entry monitoring, inadequate funding, poor quarantine enforcement, and limited laboratory testing) remained the same when classified by location, age, and among permanent MOHS staff by grade. When classified by employment status (i.e. MOHS vs non-MOHS staff) the order in ranking of the four top reasons differed slightly. Point of entry monitoring was identified as the main challenge by MOHS employees, but laboratory testing was the primary reason cited by non-MOHS respondents. MOHS employees ranked funding second, while non-MOHS respondents ranked it third. Non-MOHS respondents tended to regard the challenges as systemic: they selected 'all of the above' more often than MOHS staff.

We have created a side-by-side graph to show district and Freetown respondents' ranking of the challenges that contributed to the escalation of the pandemic (Figure 4). Responses to the open-ended question were analysed for 93 Freetown respondents (including MOHS headquarter staff) and 210 district respondents (including DHMT staff). Freetown and district respondents mentioned the issues 299 and 615 times, respectively. Poor quarantine enforcement and lack of community engagement were seen as greater challenges in Freetown than in districts – possibly a reflection of the greater numbers of infections, and hence the level of quarantine enforcement required. Districts (8%) were twice as likely to mention political tensions as Freetown (4%). Point of entry monitoring, inadequate funding, limited laboratory testing, and poor quarantine monitoring remained the top four challenges perceived to have contributed to the rapid spread of the diseases across the country.

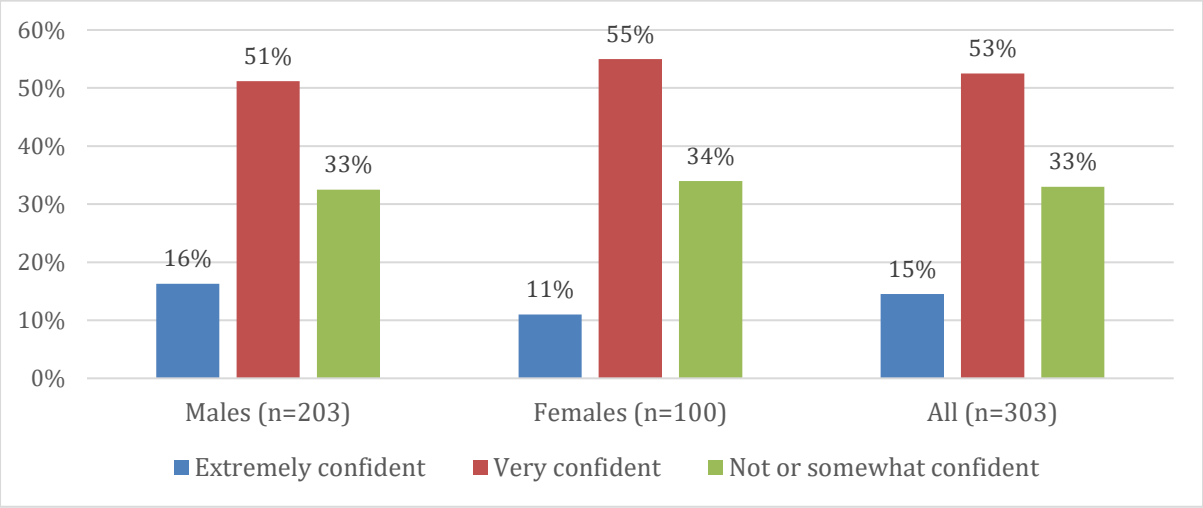
Figure 4: District/DHMT and Freetown respondents' ranking of the challenges that contributed to the spread of the pandemic (number of times issues were mentioned: Freetown =299; district = 615)



2.2.3 How confident are you in the MOHS leadership team making the right decisions to manage the COVID-19 pandemic?

There was a reported moderate level of confidence in the leadership of the MOHS to make the right decisions to manage the pandemic. Overall, 68% of the respondents reported to be extremely confident (15%) or very confident (53%) in the MOHS leadership. There was no statistically significant difference by gender: males (67%) were almost as confident as females (66%) in the leadership's ability to make the right decisions to manage the response (Figure 5).

Figure 5: Percentage of respondents that expressed confidence in the MOHS leadership managing the COVID-19 response, by gender



Small group differences were observed in the confidence of respondents in the MOHS decision-making process when classified by age, staff grade (permanent MOHS staff), location, or employment status, but these differences were not statistically significant. Freetown-based respondents (66%; n=93), including respondents from the MOHS and other partners, and district/DHMT respondents (67%; n=210), expressed similar levels of confidence in the MOHS leadership's COVID-19 decision-making process. When analysed by the permanent staff of the ministry (n=227), three out of 10 (29%) senior staff (Grade 10 and above; n=53), supervisory staff at Grades 7 to 9 (31%; n=97), and junior staff at Grades 1 to 6 (29%; n=77) of the ministry expressed limited confidence in the leadership of the ministry to make the right decisions to manage the pandemic. Only 52% of non-MOHS respondents (n= 43) said they were extremely confident (12%) or very confident (40%) in the leadership of the MOHS managing the response. The rest were either not confident or were somewhat confident in the leadership of the MOHS.

2.2.4 How are decisions about COVID-19 currently being made?

Respondents were asked an open-ended question to allow for free expression on the COVID-19 response decision-making process. Most respondents indicated that there was a top-down approach to decision-making, with leadership coming from NaCOVERC at the central level and disseminated or cascaded down to the districts or the DiCOVERCs for implementation. Within NaCOVERC, respondents talked about decisions being taken based on discussions among pillar leads or meetings within NaCOVERC, although a few respondents felt that the decisions were taken at the DiCOVERC level. A few respondents mentioned district case management teams in the hospitals and some decision-making from the MOHS leadership with DHMT involvement. However, many others pointed out that the decision makers for the COVID-19 response were not health personnel. Typical comments from respondents on the decision-making and communication channels included the following:

> *'It's a top to bottom decision-making process; meaning decisions are made at national level and later communicated at district and community levels.'*

'Decisions are made from NaCOVERC to DiCOVERC where we have the District Coordinators, Quarantine Managers, Case Managers, and other pillar heads. DHMTs discuss together with them and unanimously agree on decisions that are implemented by Quarantine Managers.'

'It's both ways. Top to bottom and bottom to top. Most times decisions are made in the meetings held and there are teams set for this COVID-19 response who are very alert in making the right decision for the disease not to escalate.'

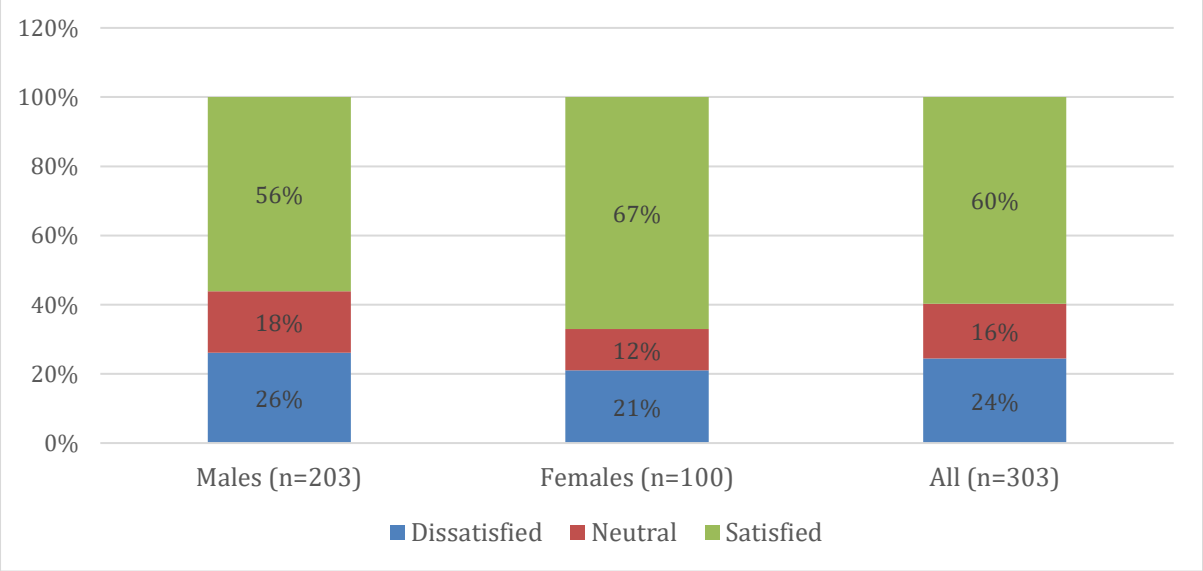
'NaCOVERC has embedded within it technical pillars and pillar heads that provide advice based on sound scientific evidence that speaks to decisions/policy. The proposals are presented to a higher authority (State House) that eventually makes the decisions, which are then filtered back down.'

'The decisions are currently made from the head. They take decisions that suit their comfort instead of the frontline workers. The decision makers have limited knowledge about health.'

2.2.5 How satisfied are you with the way decisions about the COVID-19 response are made and carried out?

This question was not specific to the MOHS but related to the general decision-making process in the COVID-19 response. Responses were measured on a five-point scale (1=very dissatisfied to 5=very satisfied) and were reduced to three levels for analysis. There was a moderate level of satisfaction with the way decisions about the COVID-19 response were made and carried out. Overall, three out of five respondents (60%) were very satisfied or satisfied with the way decisions about the COVID-19 response were made and carried out. Females (67%) expressed more satisfaction with the COVID-19 decision-making and implementation process than males (56%) (Figure 6).

Figure 6: Percentage of staff that expressed satisfaction with the COVID-19 response decision-making process, by gender



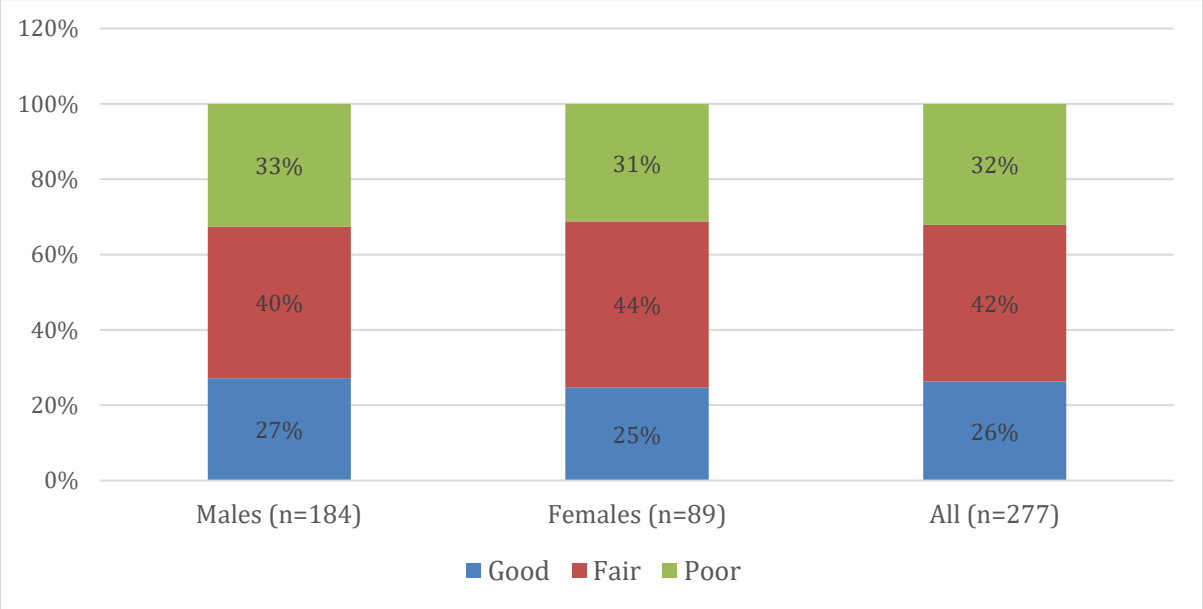
About 118 respondents reported that their primary work location was a health facility while 185 out of the 303 respondents interviewed said otherwise. The level of satisfaction with the COVID-19 decision-making and implementation process was almost the same for health facility respondents (61%) as for non-health facility respondents (59%) (that is, those who work in public health or other sectors). A lower percentage of Freetown-based respondents (56%; n=93) were satisfied with how COVID-19 decisions were made and carried out than district/DHMT respondents (61%; n=210). The proportion of Freetown-based respondents (25%) that took a neutral position was twice that of district /DHMT respondents that took the same position. A lower proportion of non-MOHS staff (44%; n =43) than MOHS temporary (64%; n=33) or permanent staff (62%; n=227) were satisfied with how COVID-19 decisions were made and carried out.

2.2.6 How would you assess the level of coordination between the MOHS and the NaCOVERC?

Response to a pandemic such as COVID-19 involves coordination with multiple stakeholders. A key leadership function during a health shock is to ensure a smooth response, with multiple partners engaged and doing their part. We asked respondents to assess the level of coordination between the MOHS and the structures established specifically to facilitate the response. Respondents were expected to rate the level of coordination as excellent, good, fair, or poor. We anticipated that respondents would report close collaboration between emergency response agencies and the relevant structures within the MOHS.

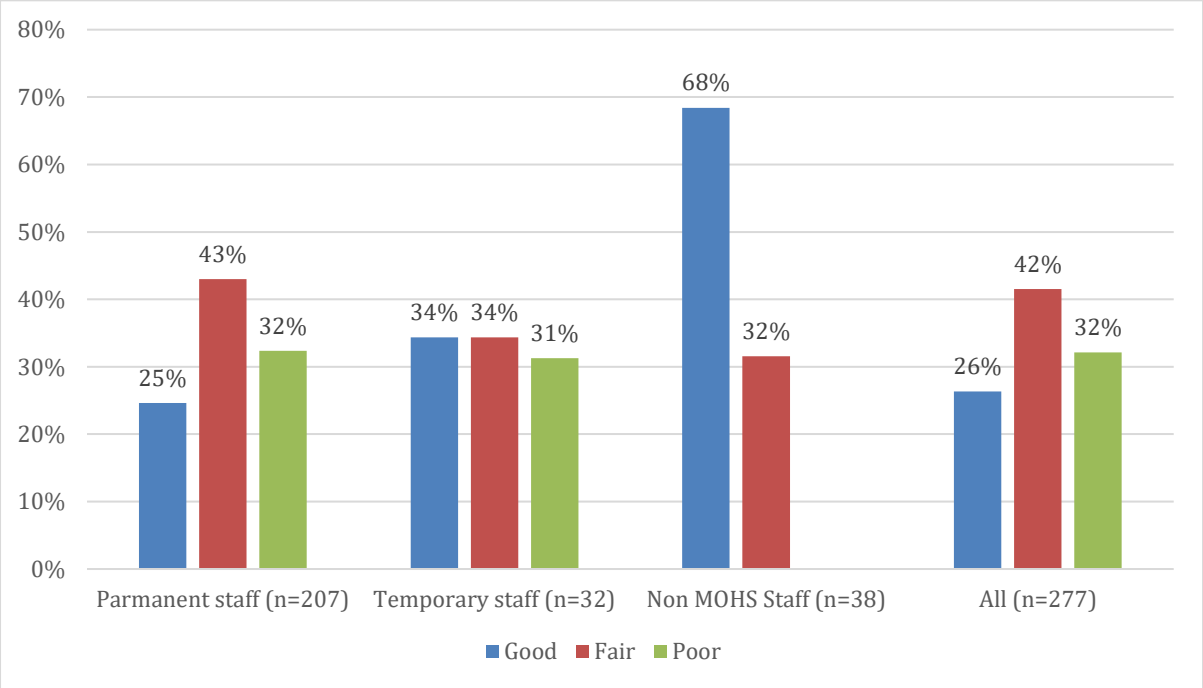
Overall, coordination of the response to the COVID-19 pandemic between the MOHS and NaCOVERC was regarded as weak. Less than 30% of respondents said the level of coordination was good. A similar low proportion of males (27%) and females (25%) said coordination between NaCOVERC and the MOHS was good (Figure 7).

Figure 7: Percentage of respondents that reported that the MOHS did a good job coordinating the response with NaCOVERC, by gender



Interestingly, those outside of the MOHS were more than twice as likely to assess coordination levels positively than those within: 68% of non-MOHS respondents (n=38) said coordination between the MOHS and NaCOVERC was excellent or good, compared to 25% of permanent MOHS staff (n=207). This appears to indicate some level of dissatisfaction within the MOHS about their involvement in the response – as reported in section 2.2.4, one of the survey findings was that the main decision makers of the COVID-19 response were non-health professionals, and anecdotally, the MOHS appears to have felt side-lined in the response. However, 43% of permanent staff (n= 207), compared to 34% of temporary MOHS staff (n=32) and 32% of non-MOHS respondents (n=38), reported that the MOHS did a fair job coordinating the response with NaCOVERC (Figure 8).

Figure 8: Percentage of respondents that reported that the MOHS did a good job coordinating the response with NaCOVERC, by employment status



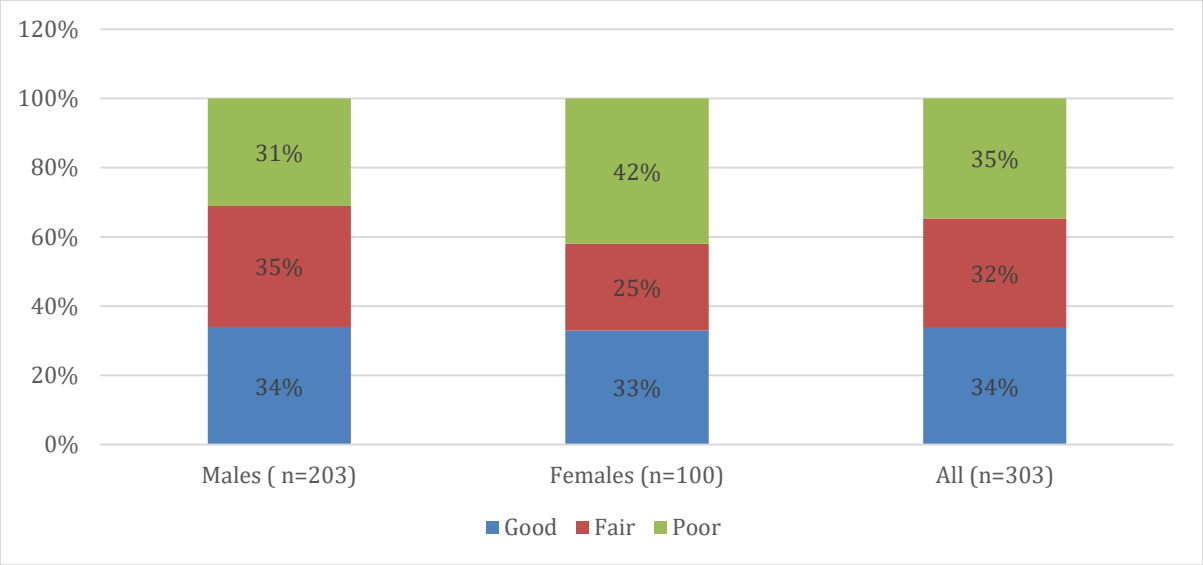
Among the permanent staff of the MOHS, only 18% of the senior staff (Grade 10 and above) assessed coordination as good. One out of two senior staff said coordination was fair. Only 27% of Freetown and 26% of district/DHMT respondents said the MOHS did a good job coordinating the response with NaCOVERC. Less than one-third of Freetown (27%) and district/DHMT (26%) respondents said coordination was good. District/DHMT respondents were more likely (36%) than Freetown respondents (24%) to report that coordination was poor.

2.2.7 How would you rate the way the MOHS is coordinating the response with other partners?

In addition to coordination with NaCOVERC**,** we asked respondents about their perceptions on the way the response was coordinated between MOHS, health development partners, and implementing partners. Overall, respondents said there was weak coordination of the response between the MOHS and health partners. Only 34% of all respondents rated coordination between the MOHS and partners as good. There was no difference between

males (34%) and females (33%) in their assessment of the level of coordination between the MOHS and partners (Figure 9).

Figure 9: Percentage of respondents that reported that the MOHS did a good job coordinating partner response to COVID-19, by gender



Across all grades, the percentage of staff that said the MOHS did a good job coordinating the response with health partners was very low. Slightly more permanent MOHS staff below Grade 7 (37%; n=77) than senior staff above Grade 9 (29%; n=53) said the MOHS did a good job coordinating the response with health partners. However, the latter gave a higher fair rating (40%) than the former (24%). Slightly more district/DHMT (35%; n=210) than Freetown respondents (30%; n=93) said the MOHS did a good job coordinating the response with partners. About 41% of Freetown respondents, compared to 32% of district/DHMT respondents, said the MOHS did a poor job coordinating the partner response. Considering the response of non-MOHS respondents (n=43), only 23% said partner coordination was good, 35% said it was fair, while 42% said coordination with partners was poor.

When the sample was divided into respondents who reported that they worked in a health facility and those who said they did not, 39% of the respondents whose primary work location was a health facility (n=118), compared to 30% of non-health facility respondents(n=185), said the MOHS did a good job coordinating the response with health partners. The proportion of health facility respondents (30%) that gave a poor assessment of the MOHS on partner coordination was lower than that of non-health facility respondents (38%).

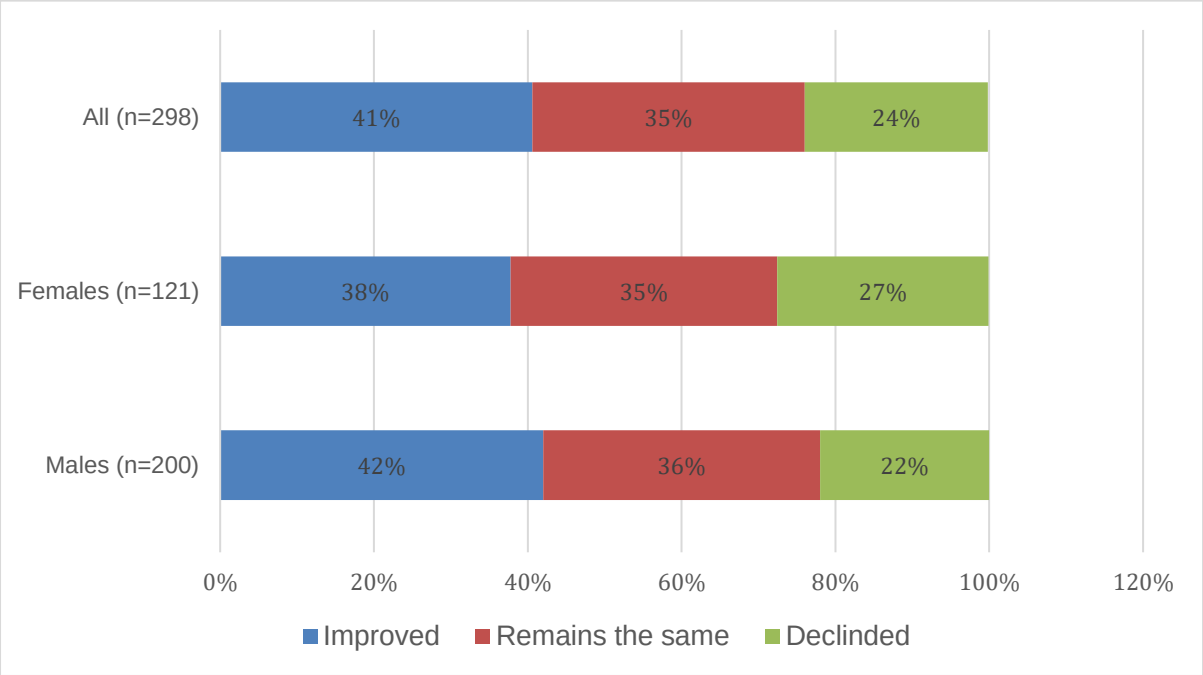
2.2.8 Compared to the Ebola response, do you think the COVID-19 pandemic coordination between the MOHS and health development partners has improved, remained the same, or declined?

The country's emergency response structures that are currently in place did not exist before the Ebola outbreak, which resulted in an initial chaotic Ebola response; emergency response structures were only put in place one year into the outbreak. Coordination was then improved, with active response pillars on community engagement and partner coordination. We asked respondents their opinion on the coordination of the COVID-19 response compared with that

of the Ebola epidemic. If lessons learned from Ebola on partner coordination were being applied, we would expect coordination to be at least the same as it was during the Ebola response.

Overall, only two out of five (41%) respondents said coordination of the COVID-19 response had improved compared to Ebola, while 35% said it had remained the same. Slightly more males (42%) than females (38%) said coordination of the COVID-19 response had improved compared to that of Ebola (Figure 10).

Figure 10: Percentage of respondents who reported that coordination had improved during COVID-19 compared to Ebola, by gender



There was no statistically significant difference in opinion among the permanent staff (n=227) of the MOHS on how COVID-19 coordination compared to coordination during Ebola. Seven out of 10 permanent staff of all grades reported that coordination of the COVID-19 response was the same or had improved compared to Ebola. A higher percentage of district/DHMT respondents (77%; n=210) than Freetown respondents (74%; n=93) said coordination during COVID-19 had improved or remained the same compared to Ebola. About 73% of the permanent MOHS staff (n=227) said coordination had improved (42%) or remained the same (31%), while 81% of the non-MOHS respondents (n=43) said it had improved (32%) or remained the same (49%).

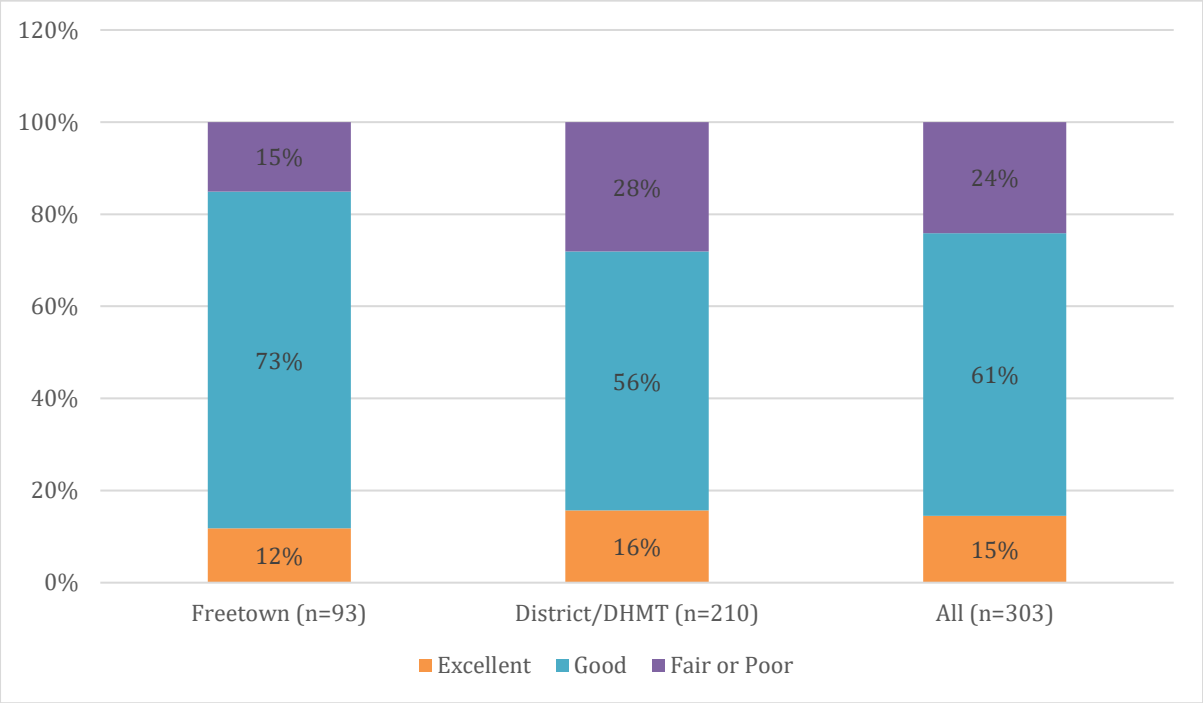
2.2.9 Overall, how would you rate the way the Government of Sierra Leone is handling the COVID-19 response?

To measure the effectiveness of the overall leadership and governance of the COVID-19 response we asked respondents to rate the Government of Sierra Leone's handling of the COVID-19 response. The results are summarised below. Overall, 76% of the respondents said the government did an excellent (15%) or good (61%) job handling the COVID-19 response. A higher percentage of males (79%) than females (70%) said the government did an excellent or good job (Figure 11).

Figure 11: Percentage of respondents who reported that the government did a good job responding to the outbreak, by gender (n = 303)

When analysed by staff salary grades, staff below Grade 7 (n=77) were less likely than those at higher grades to say the government did a good job. A lower proportion of the MOHS permanent staff (i.e. staff on the government payroll) below Grade 7 (67%), compared to staff at Grades 7 to 9 (80%; n=97) or Grade 10 and above (79%; n=53), said the government did a good job. The difference in perception may be because lower cadre staff were less likely than their senior counterparts to be involved in the response or to be informed about government efforts to control the pandemic. When analysed by the primary work location of the respondents, a slightly lower percentage of health facility (73%; n=118) than non-health facility (78%; n=185) respondents said the government did an excellent or good job responding to the outbreak. There were statistically significant differences (p = 0.017) between Freetown (n=93) and district/DHMT (n=210) respondents in the assessment of the government's response to the pandemic. About 85% of Freetown respondents (n=93), compared to 72% of district/DHMT (n=210), respondents said the government did an excellent or good job responding to the pandemic (Figure 12). The observed differences in perception may reflect the well-documented inequalities between districts and Freetown, where power is still concentrated, and some government programmes have limited national reach.

Figure 12: Percentage of respondents who reported that the government did a good job responding to the outbreak, by location



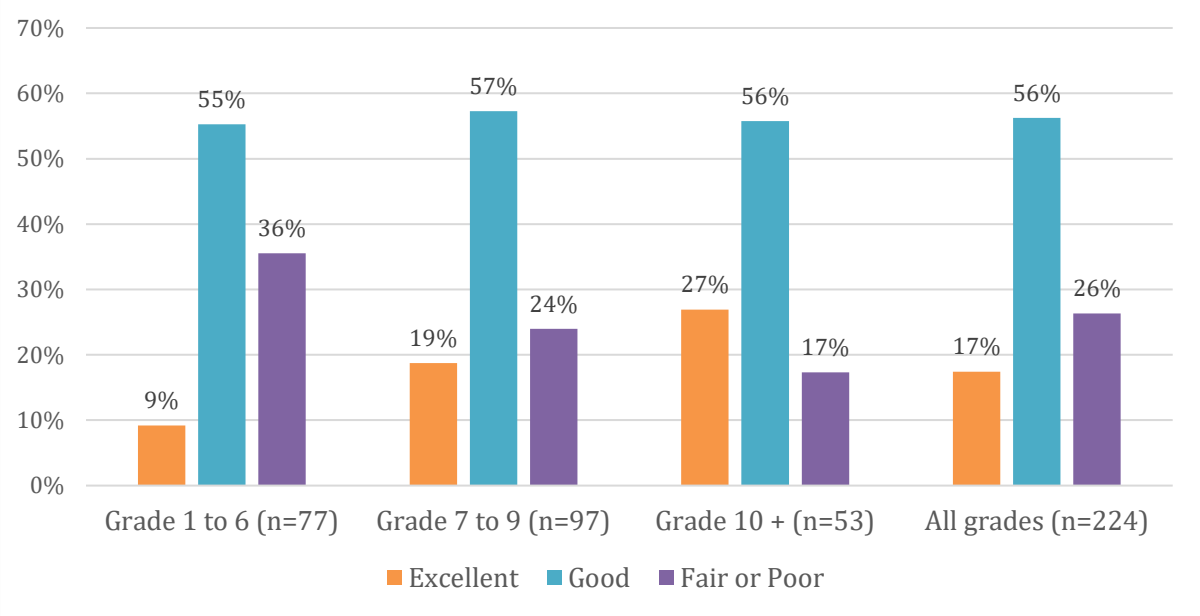
2.2.10 Overall, how would you rate the way the leadership of the MOHS is handling the COVID-19 response?

Focusing specifically on the leadership of the MOHS, we asked respondents to rate how the leadership handled the response, beyond the coordination function. Overall, two out of three respondents (72%) said the leadership of the ministry did an excellent (28%) or good (54%) job handling the COVID-19 response. When analysed by sex, females (n=100) were less likely to report that the leadership of the MOHS did an excellent job compared to males (n=203), and there was a statistically significant difference (p= 0.014) between males and females on this assessment. About 66% of females said the MOHS leadership did an excellent (9%) or good (57%) job handling the pandemic, compared to 75% of males that said they did an excellent (22%) or good (53%) job (Figure 13).

Figure 13: Percentage of respondents who reported that the MOHS leadership did a good job handling the COVID response, by gender (n = 303)

When analysed by employment status, statistically significant differences (p = 0.019) were observed between respondents' assessments of how the MOHS handled the pandemic. A significantly lower proportion of non-MOHS staff (60%; n=43) compared to the permanent (74%; n=227) or temporary (72%; n=33) staff of the ministry said the leadership of the ministry did an excellent or good job handling the response. Among the permanent staff of the ministry, statistically significant differences were reported in the assessment of how the ministry responded to the pandemic. A significantly high percentage (p= 0.041) of respondents at Grade 10 and above (83%), compared to those below Grade 7 (64%) or at Grades 7 to 9 (76%), said the leadership did an excellent or good job handling the pandemic (Figure 14).

Figure 14: Percentage of respondents who reported that the MOHS leadership did a good job handling the COVID response, by cadre



Statistically detectable differences (p = 0.031) were also observed between Freetown (n=93) and district/DHMT (n=210) respondents in the assessment of how the leadership of the MOHS handled the COVID-19 response. Freetown respondents were more likely (76%) to say that MOHS leadership did an excellent or good job handling the response than district/DHMT respondents (71%). However, district or DHMT respondents were twice as likely to say that the leadership of MOHS did an excellent job compared to Freetown residents (21% compared to 11%). The differences between health facility and non-health facility respondents on the assessment of the MOHS's handling of the response were also statistically significant (p = 0.032). A lower proportion of health facility respondents (64%; n=118) than non-health facility respondents (77%; n=185) said the leadership did an excellent or good job handling the pandemic response.

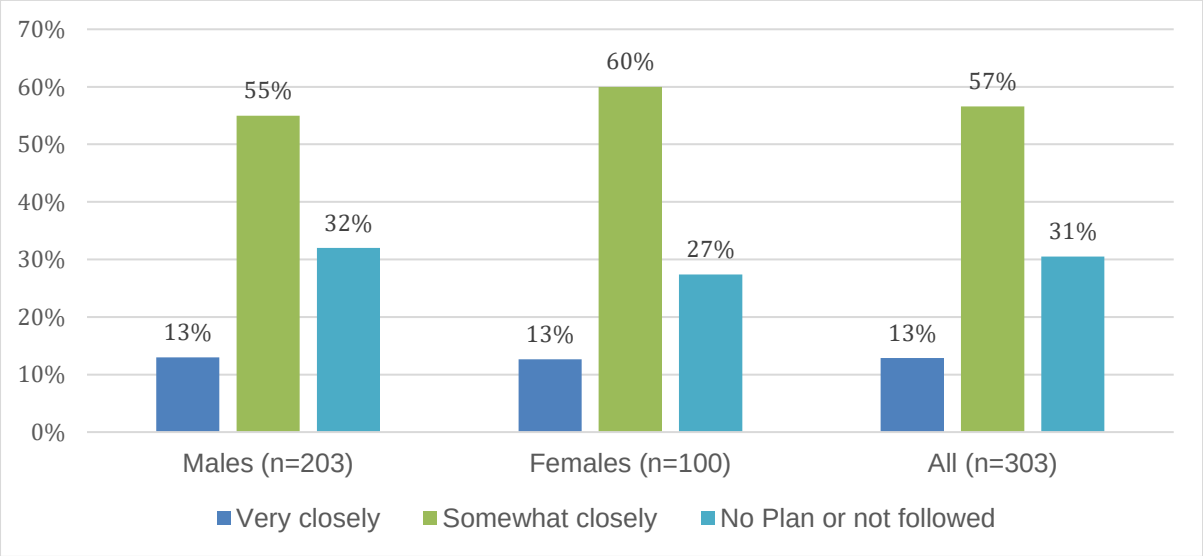
2.2.11 To what extent do you think the COVID-19 response is following laid out plans?

The MOHS has well-formulated plans, most of which were developed in response to the Ebola epidemic. For example, there is a well-articulated national health security plan and a pandemic influenza plan that were developed before the outbreak of COVID-19. There is also an emergency response plan with the provision for simulation exercises. With demonstrated commitment from the leadership, collaboration with partners, and the required resources, the implementation of these plans could help to reduce the impact of any shock to the health system. We asked the respondents whether they saw evidence that the COVID-19 response had followed laid out plans.

Many respondents across various groups indicated that the emergency response plan was followed 'somewhat closely', while three out of 10 respondents said that there was no plan or that pre-existing plans were not followed. Overall, two out of three respondents (70%; n=303) said the emergency response plan was followed very closely (13%) or somewhat closely

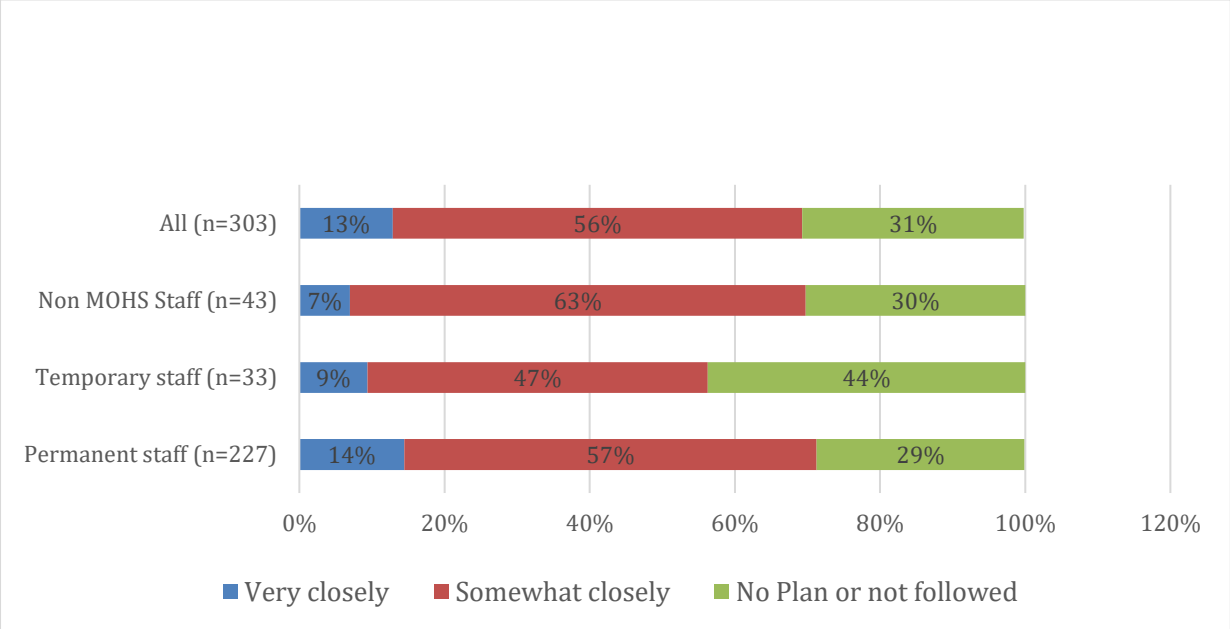
(57%). A lower proportion of males (68%) than females (73%) said laid out plans were followed (Figure 15).

Figure 15: Percentage of respondents who reported that the COVID-19 response followed plans laid out for emergency response, by gender (n = 295)



A lower proportion of temporary staff (56%; n=33) compared to permanent staff (71%; n=227) or non-MOHS respondents (70%; n=43) said the ministry very closely or somewhat closely followed laid out plans for emergency response (Figure 16).

Figure 16: Percentage of respondents who reported that the COVID-19 response followed plans laid out for emergency response, by employment status



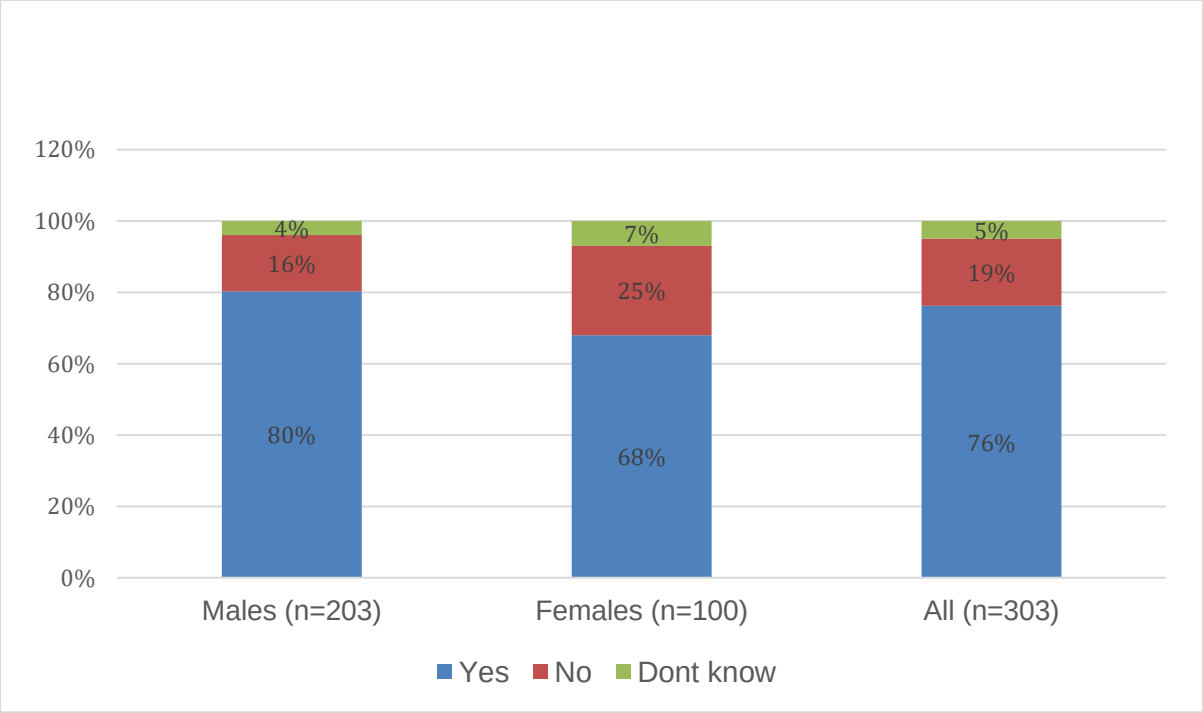
When the data were analysed based on a Freetown and district pairing, a lower proportion of district/DHMT respondents (68%; n=210) compared to Freetown-based respondents (72%; n=93) reported that the MOHS very closely or somewhat closely followed response plans.

2.2.12 If the number of COVID-19 suspected or confirmed cases were to increase to the level of the Ebola epidemic, is there a plan to manage the surge?

Effective management of health shocks requires provisions for dealing with increased volumes of patients. The command structure to coordinate operations, as well as provisions for surveillance, risk communication, and case management, should be in place and functional in order to avoid the health shock turning into a disaster. During the Ebola epidemic, the surge capacity was initially lacking, resulting in the outbreak getting out of hand. At the height of the epidemic, the MOHS, with the help of development partners, put in place several measures that helped contain the epidemic. We asked respondents whether there were plans in place to manage a surge in the number of COVID-19 cases comparable to the Ebola surge, to establish whether in the opinion of respondents, critical lessons learned from Ebola had informed the COVID-19 response.

Overall, 76% of respondents said there were plans in place to deal with a surge. More males (80%) than females (68%) said plans were in place to manage a surge (Figure 17).

Figure 17: Percentage of respondents who thought there was a plan to address a COVID-19 surge to Ebola case levels, by gender



Temporary staff of the MOHS (85%; n=33) were more likely to report that there were plans to deal with a surge in COVID-19 cases than permanent staff (75%; n=227) or non-MOHS respondents (77%; n=43). A marginally higher percentage of non-health facility (77%; n=185) than health facility (75%; n=118) respondents said the MOHS had plans in place to manage COVID-19 surge. The observed differences in perception between the two groups were not statistically significant.

2.2.13 Thinking about the health sector response to COVID-19 so far, what do you think needs improvement?

This open-ended question was designed to identify the critical challenges to the response and to determine the health system building block most seriously affected. The Maintains research plan adopted the Ouagadougou Declaration on Primary Healthcare and Health Systems in Africa Health System Strengthening framework as the health system model for the study [4]. This model outlines nine building blocks for health system strengthening that define the scope of the research, namely:

1. leadership and governance for health;
2. health service delivery;
3. human resources for health;
4. health financing;
5. health information systems;
6. health technologies;
7. community ownership and participation;
8. partnerships for health development; and
9. research for health.

Respondents' suggestions on what needed improvement were coded according to the nine-health system strengthening building blocks outlined in the Maintains Sierra Leone Country Research Plan [4]. The health system strengthening building blocks most frequently mentioned as needing improvement were: service delivery, human resources for health, drugs, medical supplies and health technologies, and health finance. There was no mention of any challenges related to research for health or health information systems in response to this question. The results are highlighted below.

Health service delivery: Continuity of health service delivery was often mentioned as an important area for improvement – where the whole gamut of what comprises health service delivery was discussed. Respondents mentioned as potential areas for improvement: the need to ensure the availability of appropriate medical logistics to ensure the availability of essential health services; improved infrastructure; the availability and effective management of isolation units and quarantine homes; improved case management; and a well-functioning incident management system capable of managing a sudden increase in the number of patients.

Human resources for health: The key human resource issues that were most often cited were the inadequate number of staff and the need for more and better training for healthcare workers. Respondents also often talked about the need to ensure prompt payment of risk allowances for health staff, as well as incentives. This issue was also frequently raised as a response to the open-ended question, 'What do you think are the main challenges to the health workforce in responding to the COVID-19 pandemic?'

Drugs, medical supplies, and technologies: Most respondents that selected this building block for improvement talked about the need for more equipment to provide essential health services. There were calls for improvement in supply chain management. Materials often mentioned for improvement in supply included: essential drugs, PPE, and laboratory materials (including test kits for the COVID-19 response).

Partnerships for health: On partnerships for health, respondents often called for greater coordination among the various partners and institutions involved in the COVID-19 response.

Health finance: The need for greater healthcare financing was interwoven in all the responses. Additionally, respondents talked about the need to ensure prompt payment of risk allowances for health staff, as well as better incentives.

Community participation: As with other questions, respondents indicated that community mobilisation and participation were wanting, with many calling for greater social mobilisation, community engagement, and participation.

Leadership and governance: Some respondents mentioned leadership and governance as an area for improvement, particularly decision-making and coordination of the health service delivery. A few respondents pointed out that decisions were politically driven, rather than motivated by the heath emergency or technical considerations.

2.3 Health workforce

A resilient health system that is effectively able to respond to health shocks should have an appropriately trained health workforce comprising clinicians, public health professions, and CHWs, for the prevention, detection, mitigation, and response to public health emergencies [26]. There should be comprehensive, well resourced, needs-based, and harmonised health workforce training (pre-service and in-service), and education programmes that cater for the different competencies required. The health workforce should have surge capacity to respond to conventional, contingency, or crises health situations, while maintaining a relative standard of care. The health workforce should not only be trained and available but should also be well motivated to ensure the continuation of essential services during an emergency [26].

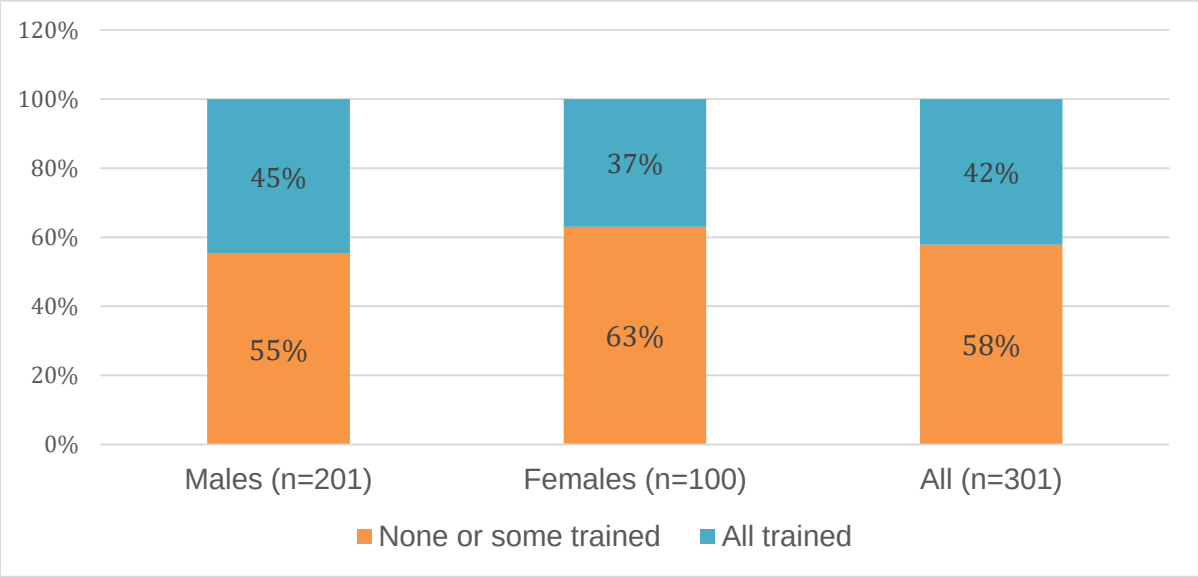
In this section of the study, we asked questions about the capacity and motivation of the health workforce, and the human resource challenges associated with the response.

2.3.1 As far as you know, have all frontline workers engaged in the provision of health services been trained in COVID-19 emergency response?

Healthcare workers, who are at higher risk of infection, need to be adequately trained in the prevailing understanding of how to manage cases, in order to strengthen their capacity to care for patients in the safest way possible. Training is important not only because it improves knowledge about the protocols or procedures to employ to deal with cases, but also because it improves employees' attitudes and confidence in regard to dealing with the emergency [27]. Six months after the country reported the first COVID-19 case, we asked respondents whether all those at the forefront of the response were trained.

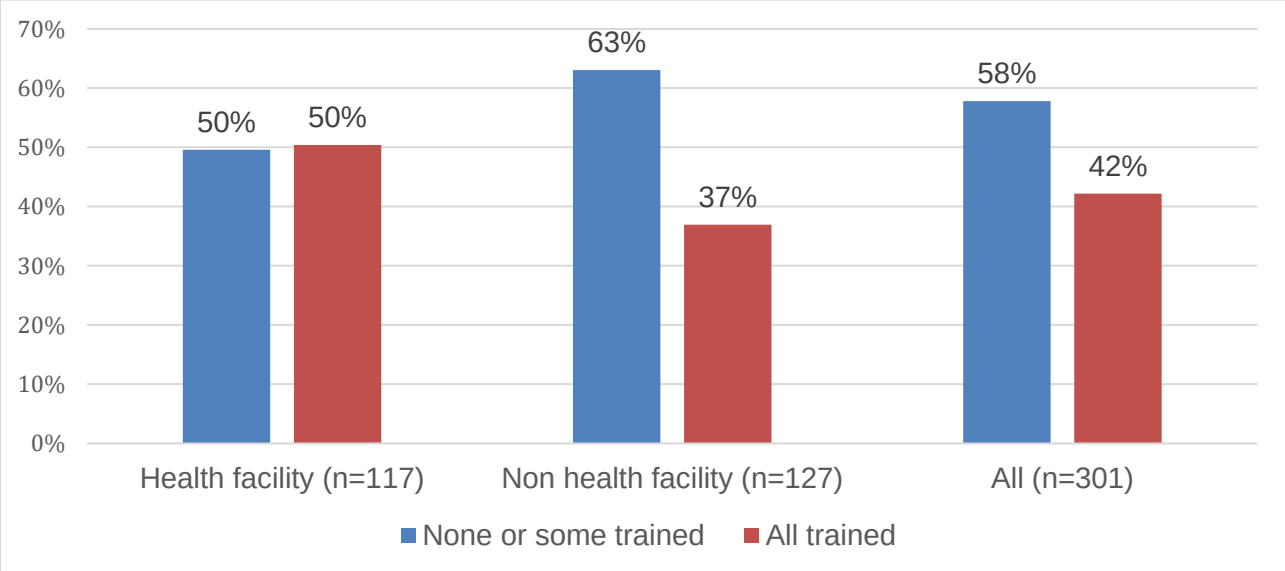
Overall, only 42% of the respondents (n=301) said all frontline workers were trained. More males (45%) than females (37%) said all frontline workers were trained (Figure 18).

Figure 18: Percentage of respondents who reported that all frontline workers had been trained on COVID-19 response, by gender



A lower percentage of Freetown-based (39%; n=91) than district/DHMT (n=209) respondents (44%) said all frontline workers had been trained. However, the differences were not statistically significant. In contrast, statistically significant differences (p = 0.022) were observed in the opinions of health facility (n=117) and non-health facility (n=184) respondents on the number of frontline workers trained. About 37% of non-health facility respondents, compared to 50% of health facility respondents, said all frontline workers were trained (Figure 19). It is likely that those within a health facility would be better placed to speak about whether training had occurred within the facility. Nevertheless, considering staff training on the pandemic response as a marker of an effective response, the overall low numbers point to perceptions of an inadequacy in the response, even though those at or near the point of care perceived training coverage to be higher than other respondents.

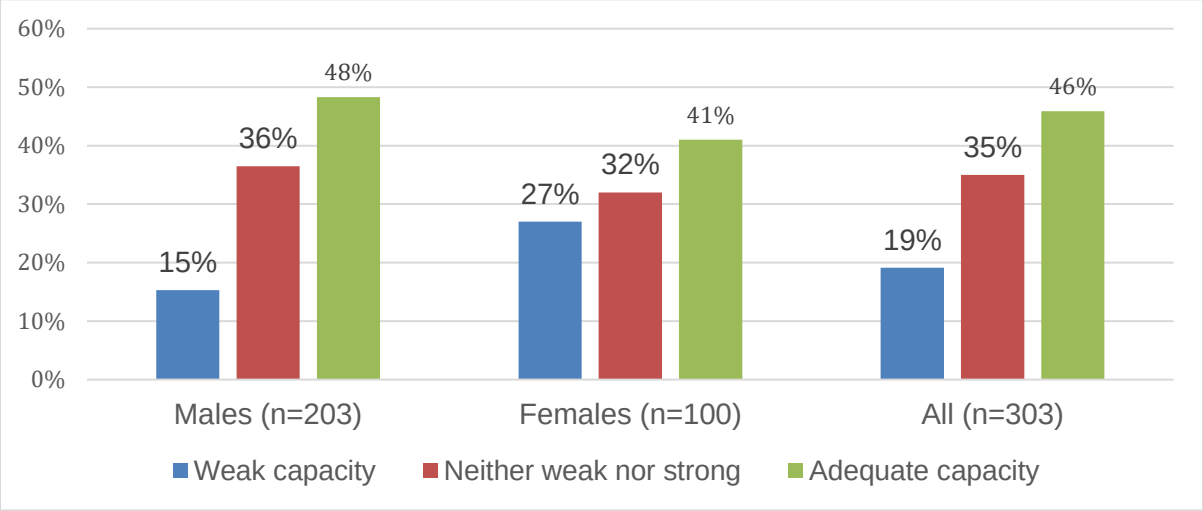
Figure 19: Percentage of respondents who reported that all frontline workers had been trained on COVID-19 response, by service type



2.3.2 How would you rate national human resource capacity to respond to the COVID-19 pandemic?

Overall, only 46% of respondents said there was adequate national human resource capacity to respond to the COVID-19 pandemic. Slightly more males (48%) than females (41%) said there was adequate human resource capacity to respond to the pandemic (Figure 20). Women were over 10 percentage points more likely to say that there was weak human resource capacity (27%) compared to men (15%). Given that women often make up the bulk of health workers who serve as frontline staff (albeit not in leadership positions), this suggests that those who would arguably be more knowledgeable about the needs of staffing were concerned about the ability of the workforce to meet the demand.

Figure 20: Respondents' rating of national human resource capacity to respond to the COVID-19 pandemic, by gender (n= 303)



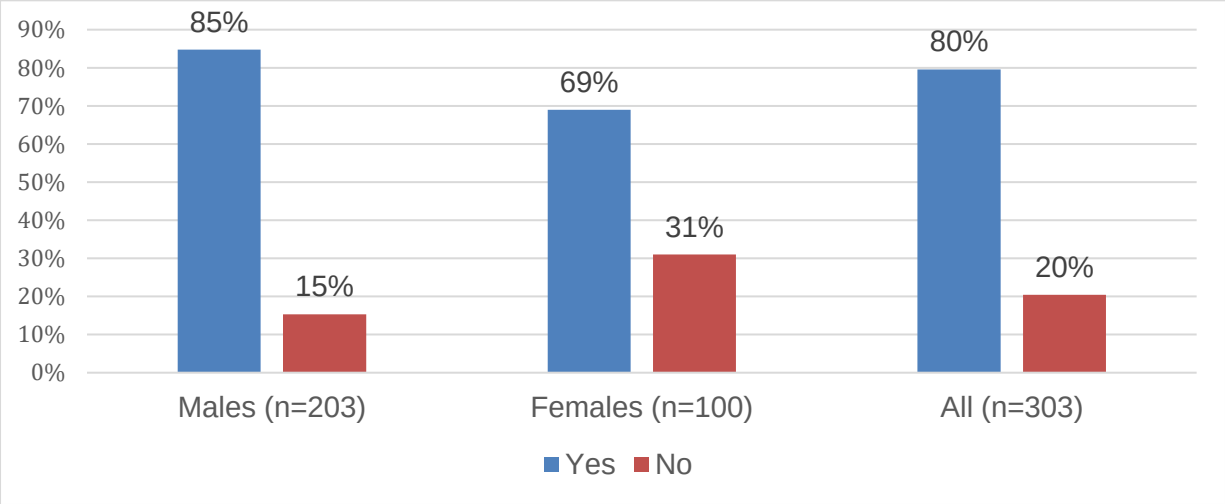
Non-MOHS respondents (30%; n=43) were less likely than temporary (39%; n=33) or permanent (50%; n=227) MOHS staff to report that there was adequate human resource capacity to respond to the pandemic. A higher proportion of senior level staff at Grade 10 and above (63%; n=53) than lower-level grade staff (46%; n=77) said there was adequate human resource capacity to respond to the pandemic. Additionally, a higher percentage of Freetown-based (48%; n=93) than district/DHMT (45%; n=210) respondents said there was adequate human resource capacity to respond to the pandemic. Health facility (45%; n=118) and non-health facility (46%; n=185) respondents had similar assessments of the adequacy of national human resource capacity to respond to the pandemic.

2.3.3 Based on your role or position in your organisation, do you think that you are as actively involved in the COVID-19 response as you would expect to be?

Overall, a high proportion of respondents (80%; n=303) said they were as adequately involved in the COVID-19 response as they would expect to be. There were statistically significant differences (p =0.002) between males (n=203) and females (n=100) on how actively they were involved in the response. Females (69%) were significantly less likely than males (85%) to report that they were as adequately involved in the response as they would expect to be based on their roles (Figure 21). About 85% of the 53 respondents within the senior cadre (i.e. the

decision-making Grades 10 and above) in the sample were males. When the responses of only the senior cadre is considered, seven out of the eight females within this cadre said they were adequately involved in the COVID-19 response, compared to 32 out of 45 males that gave the same response. Focusing only on the respondents below Grade 10 (n= 174), 86% of males (n=96), compared to 65% of females (n=78), said they were adequately involved in the response based on their role. The results suggest that the observed perceived marginalisation of women may be due to women being in less senior positions, or that, while the few women at senior levels were pleased with their level of involvement, in general women at lower levels were insufficiently included in the response.

Figure 21: Percentage of respondents that reported that they were as actively involved in the COVID-19 response as they expected to be based on their role, by gender



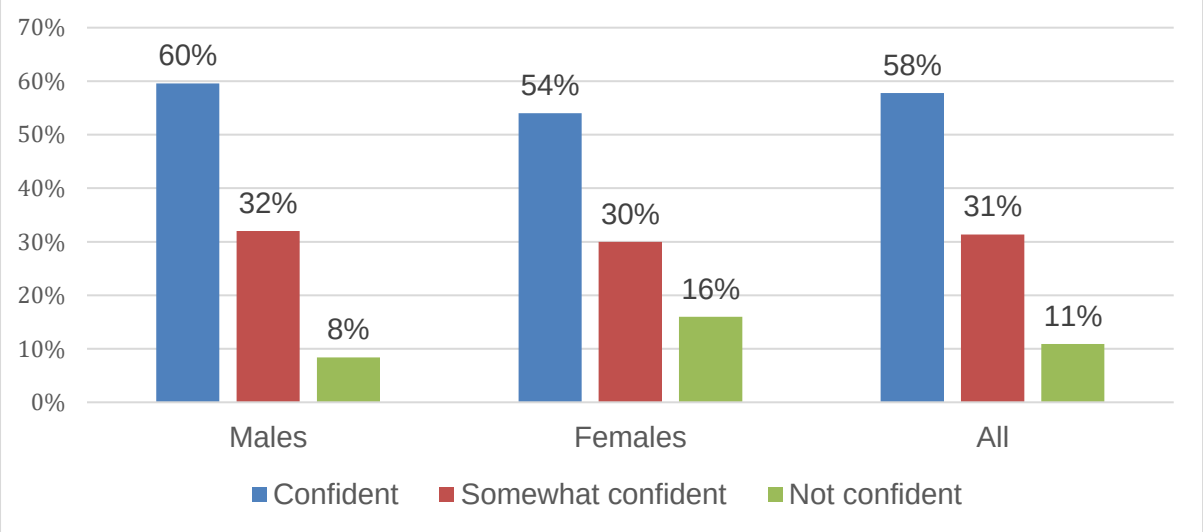
About 76% of the permanent staff (n=227), compared to 84% of non-MOHS respondents (n=43), said they were as adequately involved in the response as they would expect to be based on their role. Almost all temporary staff (97%; n=33) interviewed reported that they were adequately involved in the response based on their expectations. The differences among these groups were statistically significant (p = 0.017). A lower proportion of senior staff at Grade 10 or above (73%; n=53) than staff at Grades 7 to 9 (75%; n=97), or below Grade 7 (80%; n=77), reported that they were as actively involved in the response as they would expect to be based on their current role. Significantly more district/DHMT respondents (83%; n=210) than Freetown-based respondents (64%; n=93) said they were as actively involved in the COVID-19 response as they would expect to be based on their role (p =0.014). A high proportion of health facility respondents said they were actively involved in the response based on their role. There were only marginal differences between health facility (81%) and non-health facility respondents (79%) in their perceptions of how actively involved they were with the response.

2.3.4 How confident are you that the MOHS will select and deploy staff for the COVID-19 response based on merit?

At first glance, respondents seem to largely believe that the MOHS engaged in a merit-based selection and deployment of staff in the COVID-19 response, since an overwhelming majority (89%) reported this to be the case. However, differences between whether respondents were

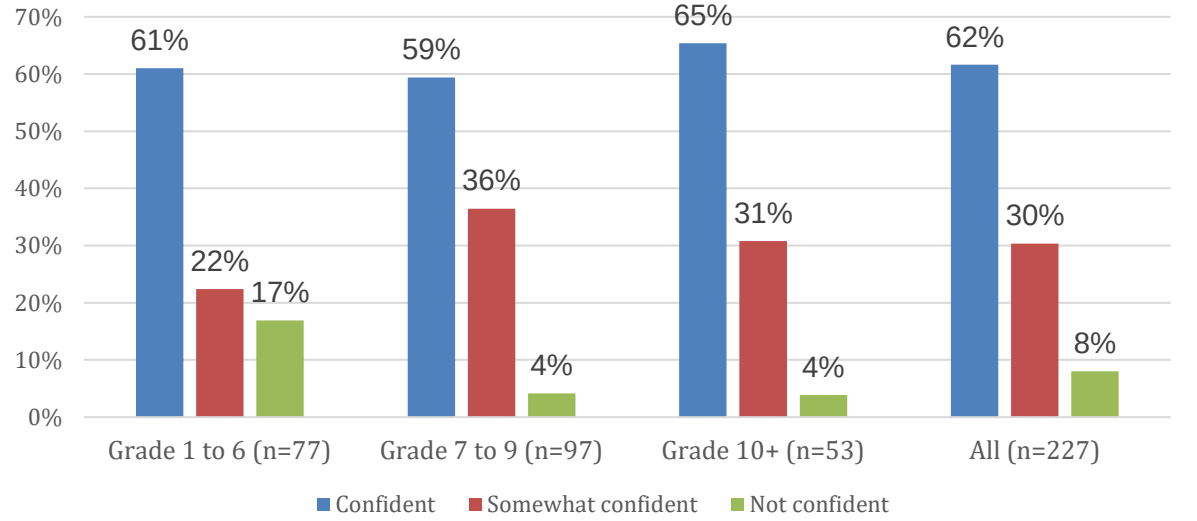
confident (58%) or somewhat confident (31%) suggest that there were concerns with the extent to which appointments were merit-based, a finding that is borne out in qualitative responses, where political influence in appointments was pointed out as one of the key challenges for the health workforce in responding to the COVID-19 pandemic (see Section 2.3.6 below). Concerns that the MOHS would make appointments based on merit were more likely to be expressed by women and junior-level staff (see below), with both less likely than males and senior staff respectively to believe that appointments were merit-based. Overall, only three out of five respondents (58%; n=303) expressed confidence in the MOHS selecting and deploying COVID-19 response staff based on merit. A lower proportion of females (54%; n=100) than males (60%; n=203) expressed confidence in the MOHS fairly selecting and deploying response staff (Figure 22). This finding supports the earlier one that females believed they were not as adequately involved in the response as they would expect to be. Perhaps one reason for this could be this perception that merit did not factor as a calculation for recruitment.

Figure 22: Percentage of respondents that expressed confidence in the MOHS deploying staff in the COVID-19 response based on merit, by gender (n= 303)



Staff outside of the MOHS (44%; n=43) were also less likely to be confident that the MOHS would deploy staff based on merit than MOHS temporary (55%; n=33) or permanent staff (61%; n=227). A higher proportion of senior staff at Grade 10 or above (65%; n=53) than staff at Grades 7 to 9 (59%; n=97) or below Grade 7 (61%; n=77) expressed strong confidence in the MOHS selecting and deploying staff fairly (Figure 23). The differences in confidence ratings across grades were statistically significant ($p = 0.009$). These findings suggest that those outside the MOHS and in junior positions were more likely to be concerned about impartiality in recruitment, while those who were most likely making the decisions and that were within the ministry were more likely to judge themselves more favourably.

Figure 23: Percentage of respondents that expressed confidence in the MOHS deploying staff to the COVID-19 response based on merit, by cadre (n= 227)



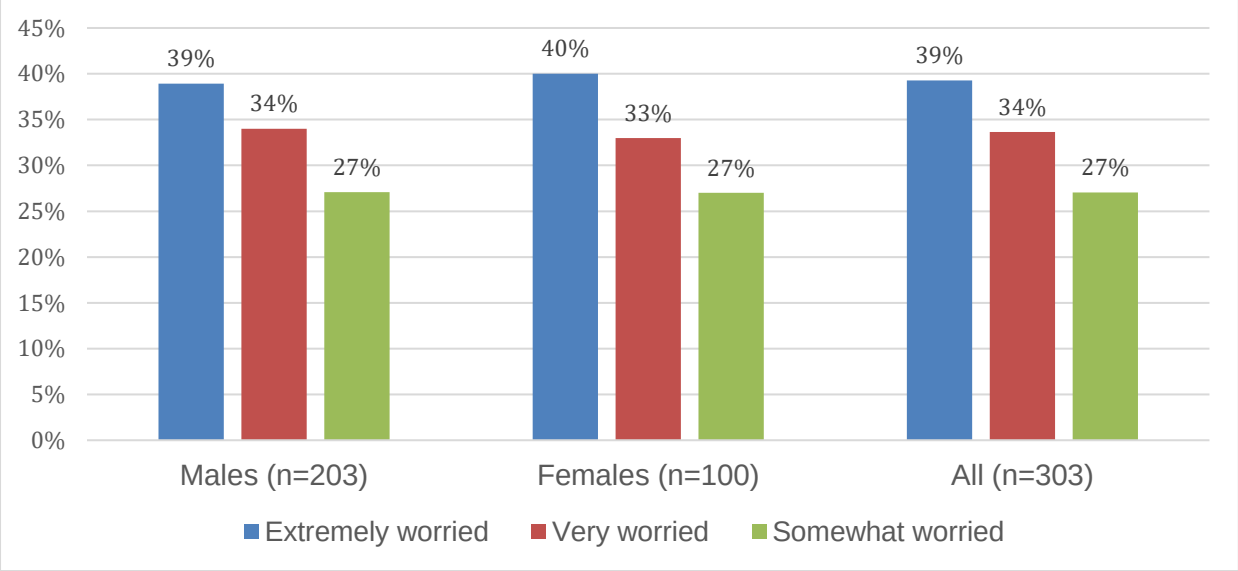
District/DHMT respondents (57%; n=210) had slightly lower unreserved confidence in the MOHS fairly selecting and deploying COVID-19 response staff than Freetown-based respondents (59%; n=93) but the differences were not statistically different from zero. A lower proportion of health facility respondents (53%; n=118) than non-health facility respondents (61%; n=185) expressed unreserved confidence in the MOHS fairly selecting and deploying response staff.

2.3.5 How worried are you that you may be infected by COVID-19?

We asked respondents to indicate their level of worry about COVID-19 infection, as an indicator of the perceived risk of, or vulnerability to, COVID-19 infection [28, 29]. Responses were measured on a five-point scale (Not worried at all = 1, to extremely worried = 5).

Most respondents were worried that they could be infected by COVID-19, indicating a high level of perceived risk and/or vulnerability. The mean worry score on a five-point Likert scale was 3.18 (SD=1.03). Overall, 73% of the respondents were extremely or very worried that they may be infected by COVID-19. Interestingly, females (73%) were equally worried as males (73%) about the potential of infection (Figure 24), although a predominant finding in the literature is that females are more susceptible to infection given their presence on the frontline as health workers, as well as caregivers, in outbreaks, including COVID-19 [30].

Figure 24: Percentage of respondents that were worried about being infected by COVID-19, by gender



When analysed by salary grade, lower-grade staff, below Grade 7 (81%) and between Grades 7 and 9 (73%), were more worried about COVID-19 infection than those above Grade 10 (66%), indicating that COVID-19-related stress is borne more by lower ranking staff who are mainly on the frontlines of the response than the senior staff of the ministry. There were no observed differences in worry about COVID-19 infection between health facility respondents (75%) and non-health facility respondents (74%), or between Freetown-based (72%) and district/DHMT (73%) respondents. Kanu *et al.* (2021) similarly found that healthcare workers were concerned about COVID-19 infections, although this concern stemmed from fears that facilities were ill-equipped and unable to provide them with the necessary resources to ensure their safety [31].

2.3.6 What do you think are the main challenges to the health workforce in responding to the COVID-19 pandemic?

The responses to this open-ended questionnaire were coded according to the nine building blocks of the health system. The main challenges are described below and summarised in Table 4.

Human resources for health: The most frequently mentioned challenges were around the availability of, and delays, in health worker compensation. It is important to note that concerns around remuneration and health worker salaries are not new – health workers in Sierra Leone have long complained about low wages and inadequate risk allowances, something that also featured prominently during the Ebola outbreak [32, 33]. Health workers went on strike over these issues during the Ebola outbreak, and did so again during COVID-19.

Respondents complained about the late payment of worker salaries and other incentives like risk allowances, as well as poor salary and incentive schemes, including (for one participant) the lack of a health insurance policy, all of which were seen to contribute to staff demotivation. As one respondent put it: '*Health workers are not insured, [there is] low remuneration and staff*

are not motivated to work.' Respondents also complained about the limited capacity-building and training opportunities for staff, as well as the low numbers of health personnel.

Drugs, medical supplies, and technologies*:* Inadequate logistics, medical supplies, and equipment were the second most frequently cited challenges to the health workforce in responding to COVID-19, followed by limited or insufficient drugs.

Service delivery*:* The lack of resources such as motor bikes, vehicles, and fuel to facilitate the movement of personnel and medical logistics were cited by most respondents as challenges to the effective functioning of the health workforce. Specifically, respondents mentioned the difficulties that healthcare workers had in accessing hard-to-reach communities and moving positive cases to quarantine facilities. According to one respondent, there were '*not enough bikes and vehicles to facilitate movement of healthcare workers*'. Several respondents mentioned the fact that health infrastructure was inadequate to ensure the effective functioning of the health system was a challenge to the health workforce. For example, they reported that '*inadequate isolation centres for suspected cases of COVID-19*' increased the risk of infection among healthcare workers, making them more cautious in giving care. According to one respondent: '*if you are not careful you can also take the diseases to your families*'. This reiterates concerns with the level of protection offered against catching the disease.

Table 4: Main challenges to the health workforce in responding to the COVID-19 pandemic

No.	Challenges	Frequency of mentions
1	**Human resources for health**	**256**
	Delays in payment of salaries and other incentives	97
	Lack of allowances, or inadequate incentives	93
	Inadequate number of health personnel	18
	Training	45
	Welfare of volunteer staff	6
2	**Drugs, medical supplies, and technologies**	**196**
	Logistics, medical supplies, and equipment	156
	Drugs	40
3	**Service delivery**	**74**
	Transportation	36
	Treatment and isolation centres	14
	Infrastructure for a functional health system	12
	Other issues affecting case management	12
4	**Leadership and governance**	**36**
	Management of response	19
	Political interference	17

5	**Community participation**	**29**
	Community beliefs, perceptions, and attitudes	21
	Limited social mobilisation	8
6	**Finance**	**27**
	Inadequate funding	
7	**Research and surveillance**	**4**
	Surveillance	4
8	**Health information**	**3**
	Health education	3
9	**Partnerships for health**	**-**

A few respondents mentioned insufficient food in quarantine, isolation, and treatment centres as challenges.

Leadership and governance: The main leadership and governance challenges mentioned were related to the general management of the response. Of particular concern were effective coordination, supervision, and monitoring of the activities of the health workforce, and political interference in the COVID-19 response. Some respondents said the COVID-19 response was '*handled by people with limited health background*'*.* According to one respondent, '*the involvement of non-technical personnel into professional positions because of political influence was a challenge to the health workforce*'. One respondent cited '*bias in the selection of workers*', while another mentioned the '*rational selection of quality health workers*' as an issue affecting the response*.*

Community participation*:* Community beliefs, perceptions, and attitudes in relation to the COVID-19 pandemic were mentioned by a few respondents as challenges to the health workforce in mounting an effective response. Some respondents reported that there was public disbelief in, and denial of the existence of, COVID-19. According to one respondent, *'one of the challenges is that people don't believe that COVID is real'.* Another respondent said: '*Sadly, there are some healthcare workers that do not believe the existence of COVID-19 and that alone poses a significant challenge to the response*'*.* Some said that this denial or disbelief translated into limited compliance with precautionary public health measures, such as the use of face masks and social distancing. One respondent mentioned the stigmatisation of health workers: '*as long as I am directly working, there is greater percentage I might have it and people might not want to even come closer to you*'*.* Limited community-based social mobilisation was also mentioned by a handful of respondents; however, concerns with community engagement emerged more prominently in responses that specifically addressed community ownership and participation, as reflected below.

Health financing*:* Most of the challenges related to the health workforce, such as delays in (or inadequate) risk allowances, limited training, inadequate medical logistics etc., can be associated with inadequate financing. Nevertheless, respondents mentioned inadequate funding as a challenge at least 27 times.

2.4 Community ownership and participation

One of the lessons learned from the Ebola epidemic was that an effective emergency preparedness and response to health shocks should have a community focus. In the community ownership and participation section of the study we examined the perceptions of respondents on the effectiveness and functioning of the COVID-19 district structures, the availability of contact tracers at community level, the level of community involvement in the response, and the challenges to the effectiveness of the community response. We also asked several open-ended questions to obtain detailed information.

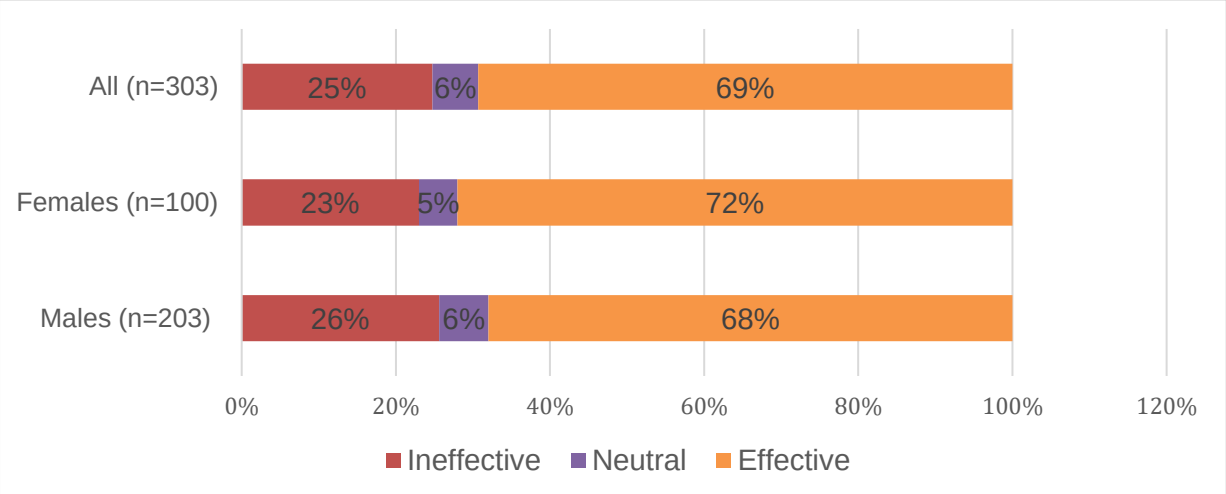
2.4.1 How would you rate the functioning of the DiCOVERC in your district?

To gauge how effectively the district structures were operating, we asked respondents to rate the operations of the district response centres in their districts. All 16 districts were represented. Approximately 5% of the respondents (n=303) were interviewed in each district, except Karene and Western Urban districts, which had 4% and 26% of the respondents, respectively. The responses were measured on a five-point Likert scale (1 = very ineffective to 5 = very effective).

There were DiCOVERCs in all districts. The overall average effectiveness score on the functioning of the DiCOVERCs was 3.7 (SD=1.4), as measured on a five-point scale. This implies that these centres were approximately 75% effective when translated to a 100% scale, indicating sub-optimal operations (Figure 25). There were no statistically significant differences between males (mean 3.73, SD =1.39) and females (mean =3.77, SD = 1.37) in their ratings of the effectiveness of these centres. There were also no meaningful differences between the ratings of district/DHMT respondents (mean =3.75, SD =1.41) and Freetown-based respondents (mean = 3.73, SD =1.33).

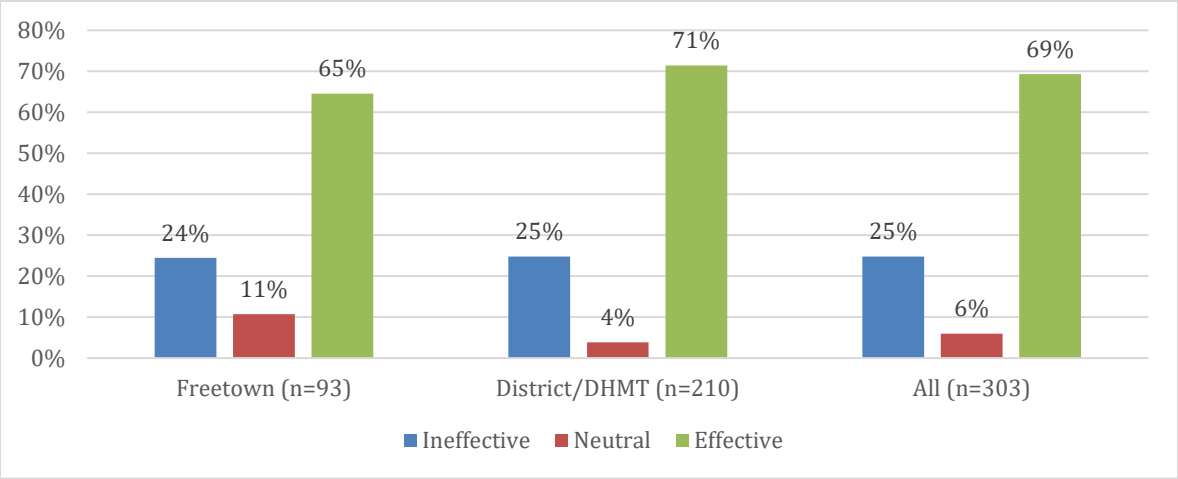
Overall, 69% of the respondents said district COVID-19 committees were effective or very effective. Slightly more females (72%) than males (68%) said the committees were effective (Figure 25).

Figure 25: Respondents' rating of the functioning of district COVID-19 committees, by gender



A higher percentage of non-MOHS respondents (79%; n=43) than MOHS permanent staff (68%; n=227) or temporary staff (67%) surveyed said the district committees were effective or very effective. Senior staff of the MOHS at Grade 10 or above (63%; n=53) were less likely than those below Grade 7 (72%; n=77) or between Grades 7 and 9 (67%; n=97) to report that district committees were effective or very effective. District/DHMT respondents (71%; n=210) were more likely than Freetown-based (65%; n=93) respondents to report that district committees were effective or very effective (Figure 26).

Figure 26: Respondents' rating of the functioning of district COVID-19 committees, by location



Health facility (70%; n=118) respondents were as likely as non-health facility (69%; n=185) respondents to report that district committees were effective or very effective.

2.4.2 Compared to the Ebola response, how involved are community groups in the COVID-19 pandemic response?

Community involvement was measured on a four-point scale (less involved = 1, remains the same = 2, somewhat involved = 3, and more involved = 4). The overall estimated score for community involvement in the COVID-19 response measured on a four-point scale, when compared to Ebola, was 2.9 (SD =1.17). The score did not vary significantly across groups (Table 5).

Table 5: Community involvement in the COVID-19 response scores by respondent categories (n=297)

Variable	Category	N	Mean	SD
Gender	Males	201	2.9	1.18
	Females	96	2.8	1.16
Age	21–34 years	69	2.8	1.16
	35–49 years	159	2.9	1.18
	50 years and above	69	2.8	1.16
	Permanent staff	222	2.8	1.17

Employment status	Temporary staff	32	2.9	1.23
	Non-MOHS staff	43	3.0	1.12
Salary grade (MOHS permanent staff only)	Grades 1 to 6	76	2.9	1.18
	Grades 7 to 9	96	2.8	1.23
	Grade 10 and above	50	2.8	1.09
Location	Freetown	91	2.9	1.09
	District/DHMT	206	2.8	1.21
Duty station	Health facility	115	2.9	1.22
	Non-health facility	182	2.8	1.14
	All	297	2.9	1.17

Overall, 36% of respondents said communities were more involved in the COVID-19 response compared to Ebola, with only 3% reporting that community engagement remained the same. More males (38%) than females (32%) said communities were more involved in the response compared to Ebola (Figure 27).

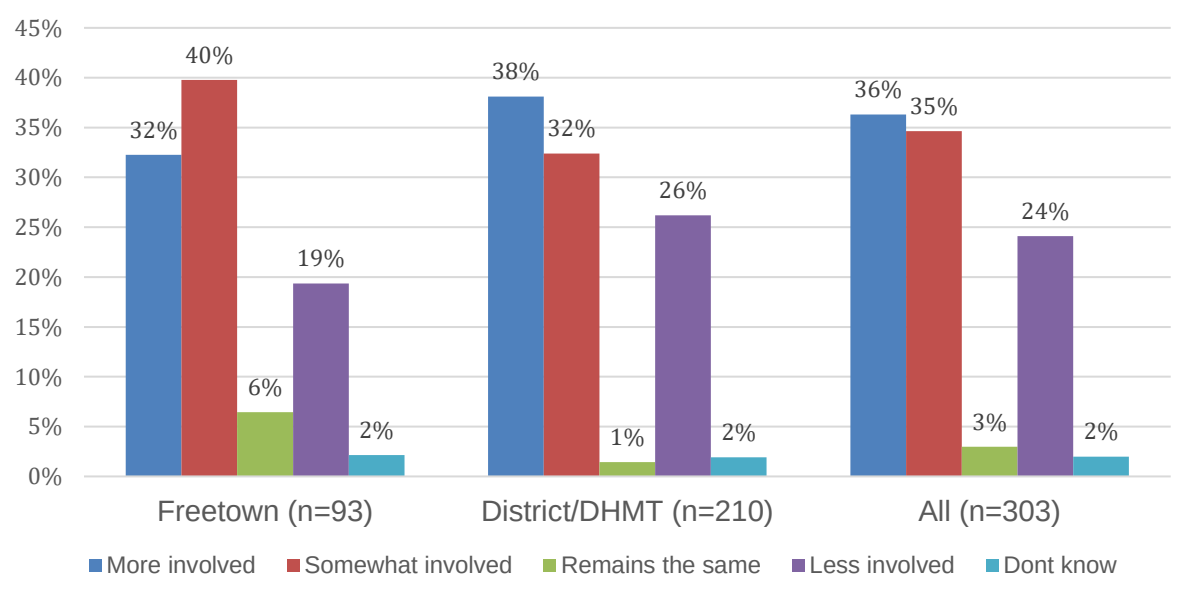
Figure 27: Respondents' perceptions of community involvement in the COVID-19 response compared to the Ebola response, by gender (n = 303)

Non-MOHS respondents (42%; n=43) were more likely than MOHS permanent staff (34%; n=227) to report that community participation had improved.

A lower percentage of senior MOHS respondents (25%; n=53) compared to those at lower grades – Grades 1 to 6 (38%; n=77) and Grades 7 to 9 (36%; n=97) – said community participation had improved. A lower percentage of Freetown-based (32%; n=93) than district/DHMT respondents (n=210) said community involvement had improved (Figure 28).

Additionally, a lower proportion of non-health facility respondents (32%; n=185) than health facility respondents (42%; n=118) said community involvement had improved. However, other responses from open-ended questions in the survey suggest that it was felt that community engagement needed to be stronger.

Figure 28: Respondents' perceptions of community involvement in the COVID-19 response compared to the Ebola response, by location

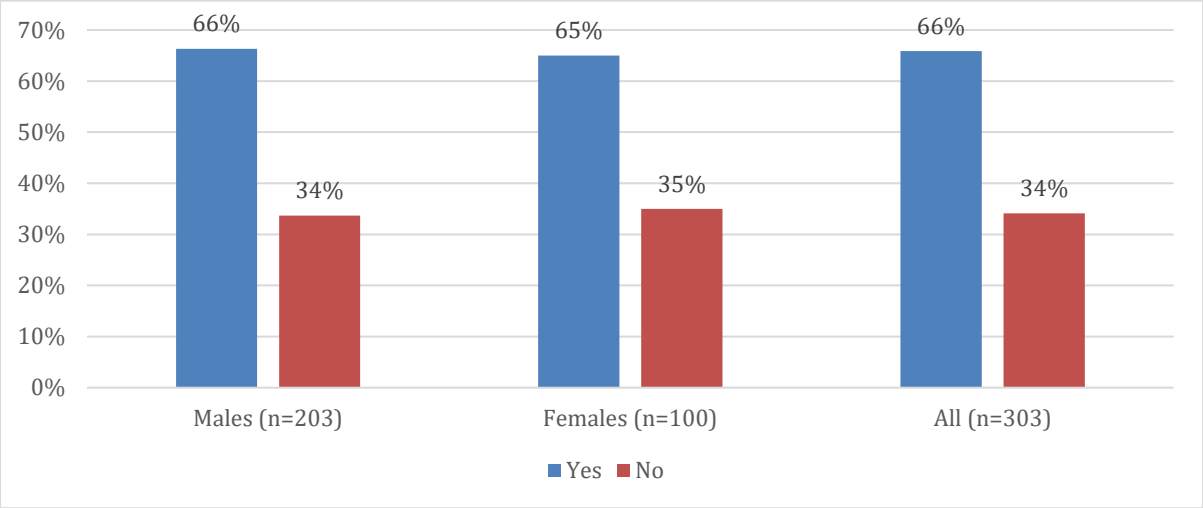


2.4.3 Thinking about district-level response, are there adequate contact tracers to respond to the COVID-19 pandemic?

Contact tracing involves systematically identifying all persons that encounter an index case and screening them for symptoms of the disease. Contacts with symptoms are quarantined, monitored, and treated if positive, to prevent further transmission of the disease [34]. During the 2014 Ebola outbreak, contact tracing was one of the most effective interventions that contributed to the end of the epidemic. Contact tracers were recruited either from the pool of existing CHWs or from other members of the community. Community trust and awareness of contact tracing and the processes involved were established, which made it easier to implement such an approach during the pandemic. Following the outbreak of COVID-19, the MOHS also recruited contact tracers, some of whom included CHWs. As a measure of how effectively the health sector responded to the COVID-19 pandemic, we asked respondents whether, in their opinion, there were adequate contact tracers in place at the district level.

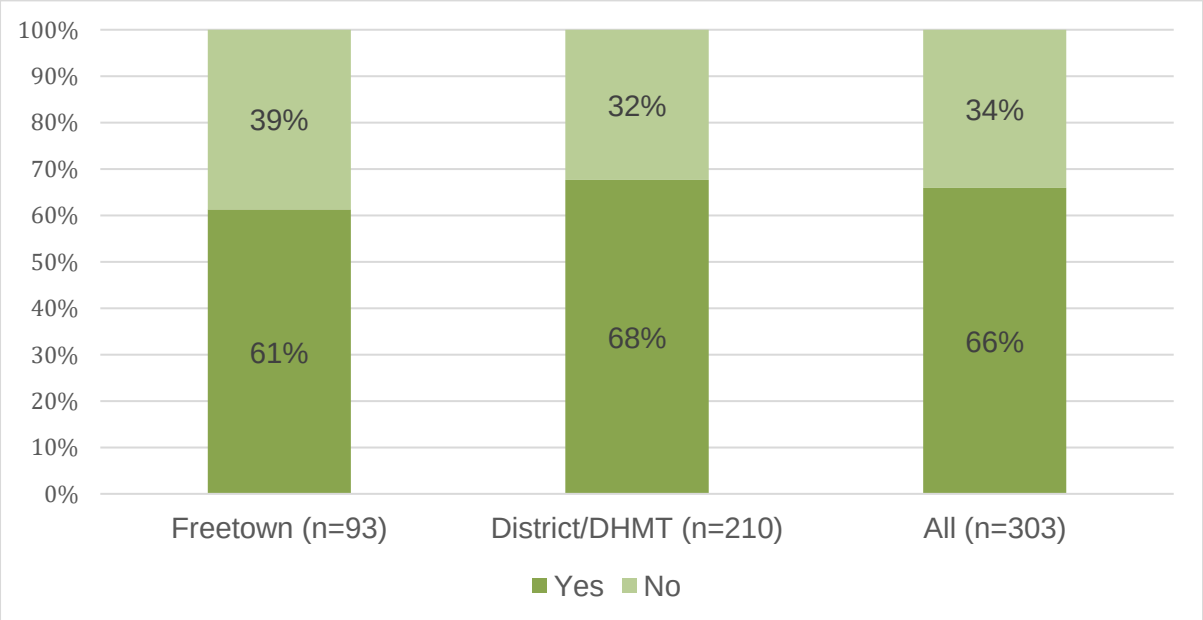
Approximately 66% of all respondents (n = 303) said there were adequate contact tracers at the district level. There were no differences in the perceptions of males (66%) and females (65%) on the availability of contact tracers at district level (Figure 29).

Figure 29: Percentage of respondents that reported that there were adequate contact tracers in districts for the COVID-19 response, by gender



Non-MOHS respondents (60%; n=43) were less likely than MOHS respondents (66%; n=227) to report that there were adequate contact tracers at district level. Health facility respondents (71%; n=118) were more likely than non-health facility respondents (62%; n=185) to report that there were adequate contact tracers in the districts. A lower percentage of Freetown-based (61%) than district/DHMT (68%) respondents said there were adequate contact tracers at district level (Figure 30).

Figure 30: Percentage of respondents that reported that there were adequate contact tracers in districts for the COVID-19 response, by location



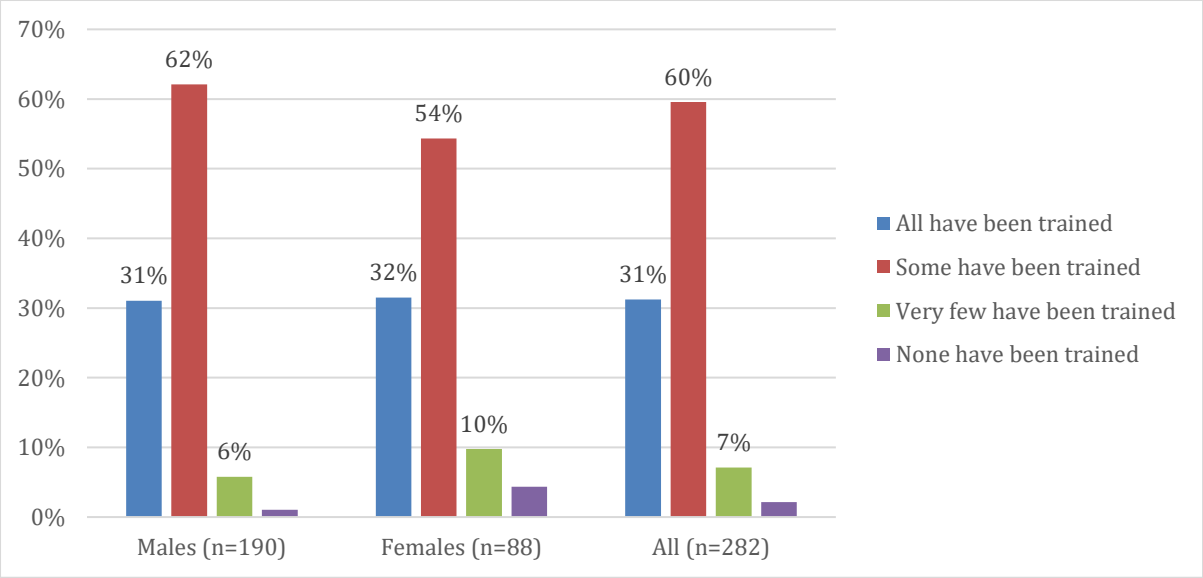
2.4.4 Have CHWs been trained on COVID-19 response activities?

CHWs were actively involved in the Ebola response in multiple roles. Following the end of Ebola, approximately 14,500 CHWs were trained using a revised and standardised curriculum, and deployed across the country. The CHW policy was also revised at this time.

The new policy formalised the role of CHWs and provided for an incentive structure for them [35]. As outlined in the CHW policy, the main role of CHWs is to increase access to healthcare services at the community level. During a health emergency, they can provide the additional support staff needed at the community level if they are properly trained and utilised. Our aim in this study was to examine how CHWs were used in the COVID-19 response. Specifically, whether they were trained, what they were assigned to do, and how effectively the respondents thought they were able to carry out their roles during the pandemic.

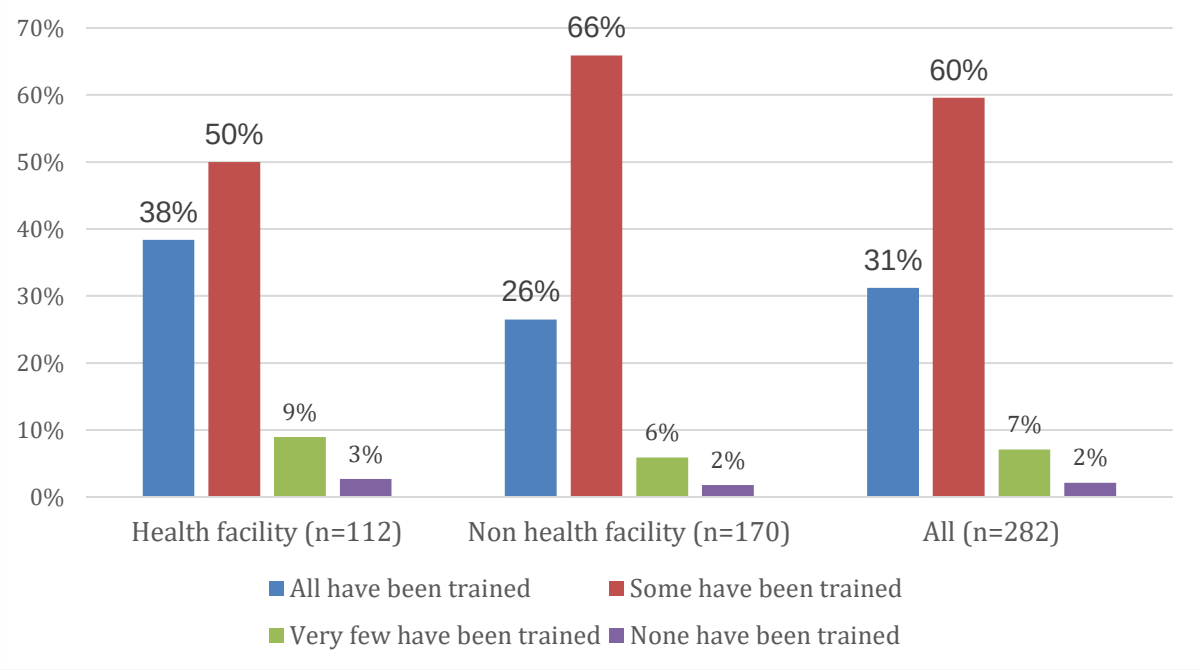
Overall, 31% of respondents (n=282) said all CHWs were trained, while 60% said some were trained. More males (93%; n=190) than females (86%; n=88) said some or all CHWs were trained on the COVID-19 response (Figure 31).

Figure 31: Percentage of respondents who reported that CHWs were trained on the COVID-19 response, by gender



Almost all MOHS temporary (97%; n=30) and permanent employees (89%; n=211) and non-MOHS (91%; n=41) respondents reported that all or some CHWs were trained on the COVID-19 response. There were statistically significant differences between Freetown-based and district/DHMT respondents in their opinion on whether all or some CHWs were trained ($p = 0.008$). District/DHMT respondents (36%; n=200) were more likely than Freetown-based respondents (21%; n=82) to report that all CHWs were trained. About 88% of health facility respondents (n=112) said all or some CHWs were trained, while 92% of non-health facility respondents (n=170) said all (26%) or some (66%) CHWs were trained (Figure 32). The differences were not statistically detectable. Grieco and Yusuf (2020) note that CHWs were indeed trained during the response, pointing out that several hundred were being re-trained to serve as contact tracers, which took them away from what they termed their 'peacetime' jobs in health promotion in their home communities [36].

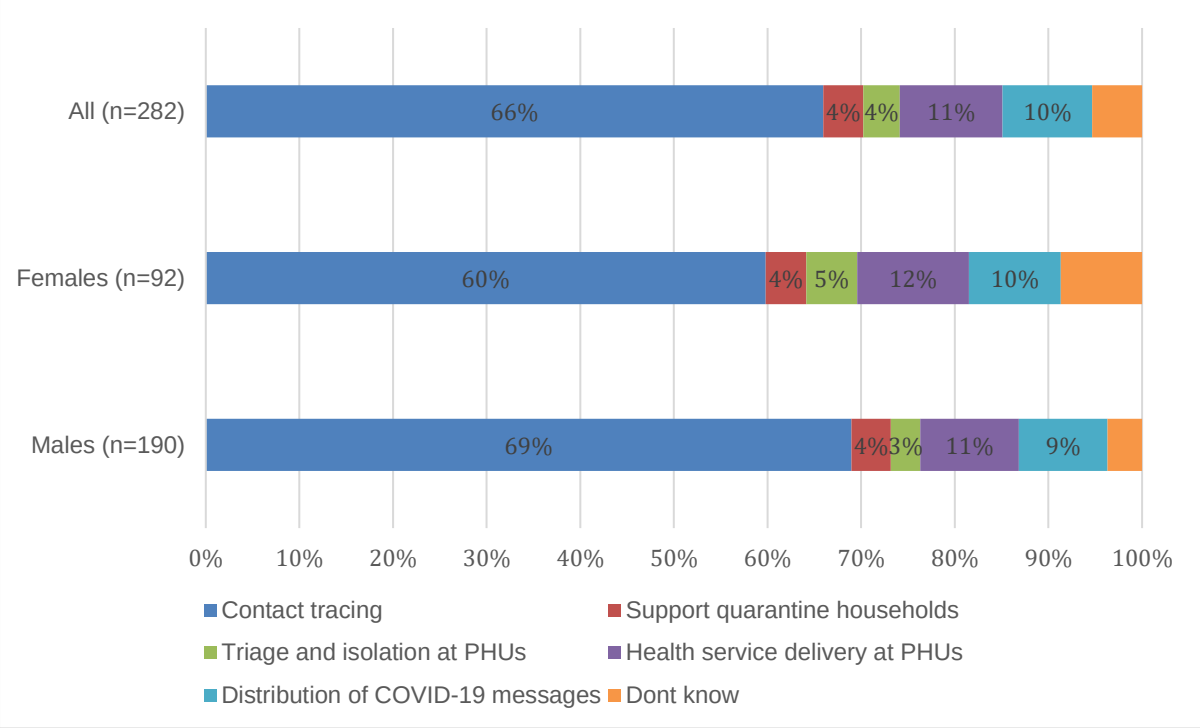
Figure 32: Percentage of respondents who reported that CHWs were trained on the COVID-19 response, by employment status



2.4.5 What have CHWs been assigned to do?

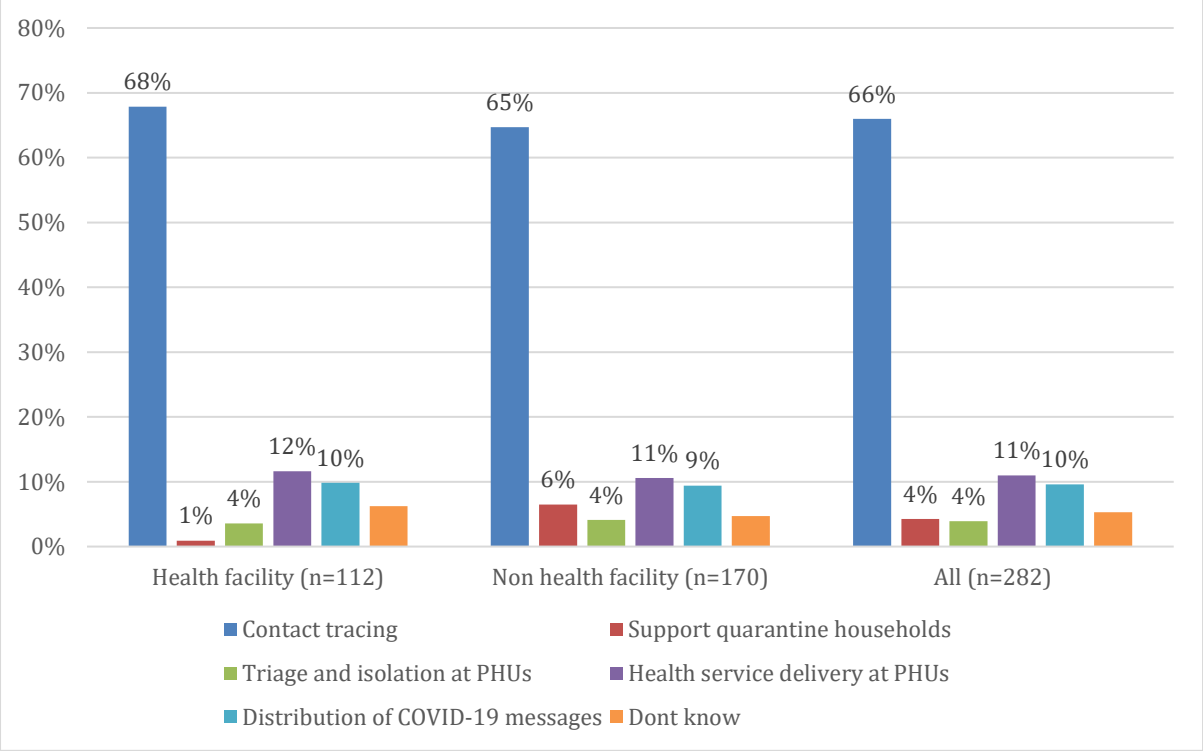
CHWs were mainly assigned to conduct contact tracing during the COVID-19 response. Overall, two out of three respondents (66%; n=282) said their main role was contact tracing. A higher percentage of males (69%; n=190) than females (60%; n=92) said CHWs were mainly assigned to do contact tracing. The second most often cited activity was service delivery at PHUs, followed by risk communication (Figure 33).

Figure 33: Percentage distribution of respondents' perceptions on what CHWs were assigned to do during the COVID-19 response, by gender



A slightly higher percentage of district/DHMT (69%; n=200) than Freetown-based (59%; n=82) respondents said the main activity carried out by CHWs was contact tracing. Freetown-based respondents cited support to quarantine households as the third activity assigned to CHWs in addition to contact tracing and health service delivery at PHUs, while district/DHMT respondents cited risk communication as the third activity. Almost the same percentage of health facility (68%; n=112) and non-health facility (69%; n=170) respondents said the main activity CHWs were assigned to do was contact tracing, followed by service delivery at PHUs: 12% and 11%, respectively (Figure 34).

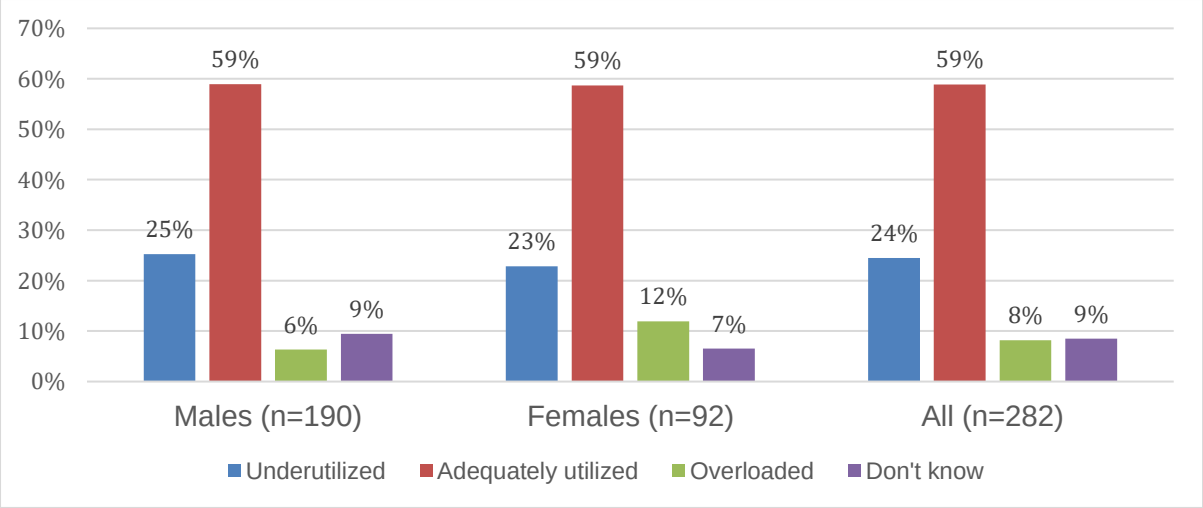
Figure 34: Percentage distribution of respondents' perceptions of what CHWs were assigned to do during the COVID-19 response, by duty station



2.4.6 How would you assess the way CHWs have been involved in the COVID-19 response so far?

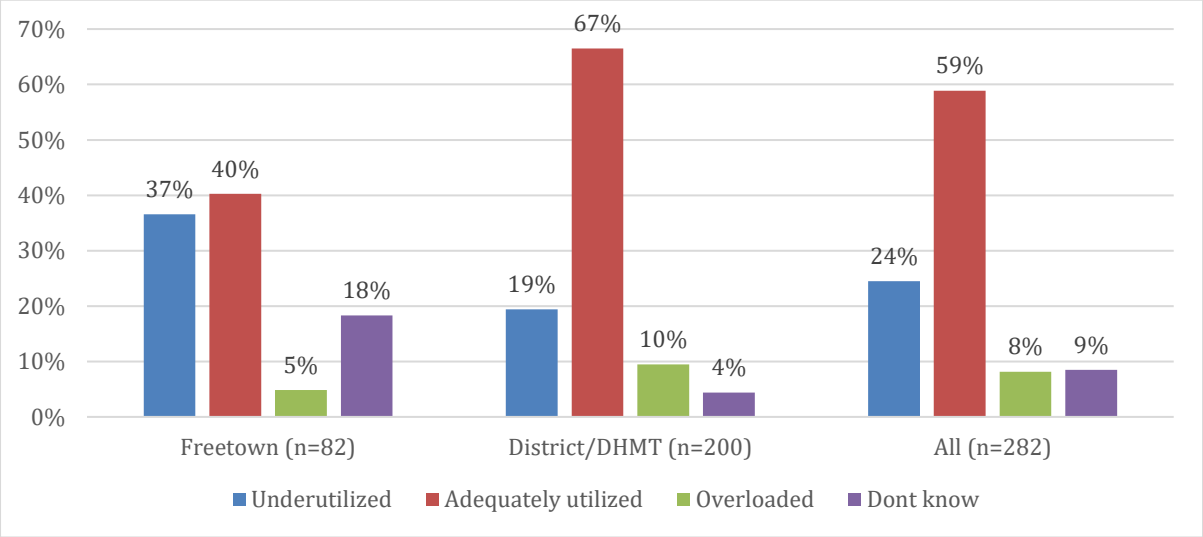
Overall, three out of five respondents (59%; n=282) said CHWs were adequately utilised. There were no statistically detectable differences between males (59%; n=190) and females (59%; n=92) in the assessment regarding whether CHWs were adequately involved in the response (Figure 35).

Figure 35: Percentage of respondents who reported that CHWs were adequately utilised in the COVID-19 response, by gender (n=282)



When classified by employment status, temporary MOHS employees (70%; n=30) were more likely than permanent employees (57%; n=211) or non-MOHS respondents (59%; n=41) to report that CHWs were adequately utilised. One out of four permanent MOHS employees (25%), compared to one out of three non-MOHS (29%) employees, in the sample said CHWs were underutilised. Among the permanent MOHS employees, there were statistically detectable differences (p = 0.001) in opinions about whether CHWs were adequately utilised, underutilised or overloaded during the COVID-19 response. Overall, 57% of the permanent staff said CHWs were adequately utilised. A lower proportion of senior staff at Grade 10 or above (47%; n=46) said CHWs were adequately utilised compared to those below Grade 7 (56%; n=74) or between Grades 7 and 9 (62%). Opinions on how the CHWs were utilised during the pandemic were divided between district/DHMT and Freetown-based respondents. Significantly more district/DHMT (67%) than Freetown-based (40%) respondents said CHWs were adequately utilised (p <.000) (Figure 36).

Figure 36: Percentage of respondents who reported that CHWs were adequately utilised in the COVID-19 response, by cadre



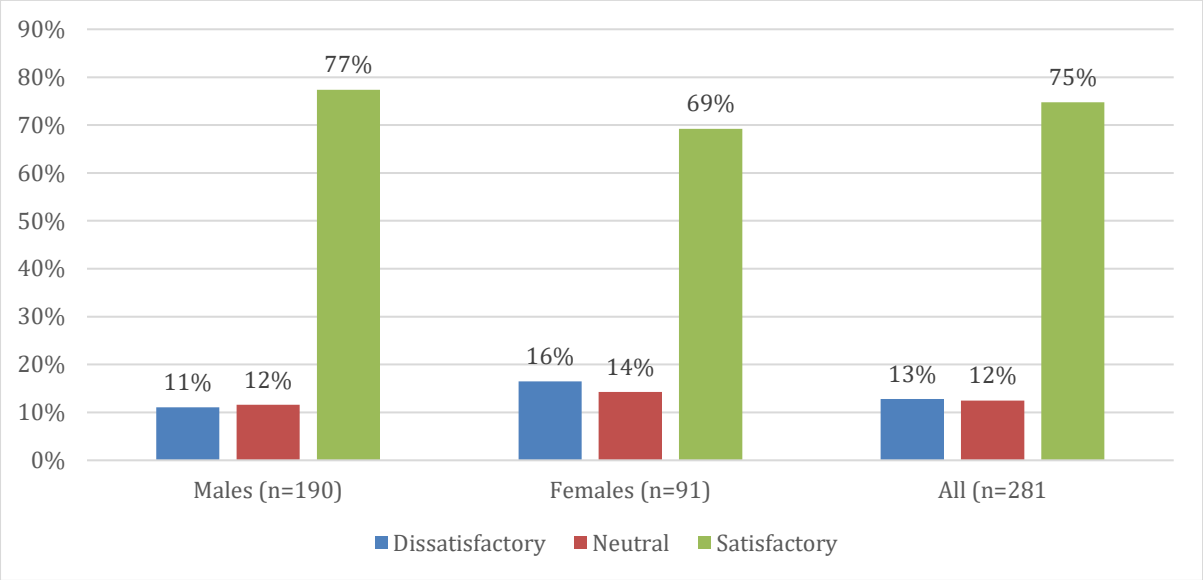
A higher proportion of health facility (62%) than non-health facility (57%) respondents said CHWs were adequately utilised but the differences were not statistically detectable at the 5% level of significance.

2.4.7 How would you assess the efforts of the MOHS to work with local leaders and different community groups on the COVID-19 response?

Respondents were asked to assess the efforts of the MOHS to work with local leaders on the response by indicating their level of satisfaction with the ministry's efforts. The level of satisfaction was measured on a five-point Likert scale (1 = very dissatisfactory to 5 = very satisfactory). The mean level of satisfaction for all respondents assessed on a five-point scale was 3.7 (SD= 0.87), which was higher for males (mean = 3.7, SD = 0.84) than for females (mean = 3.5, SD = 0.93). The responses were aggregated to three levels for ease of analysis and presentation. Overall, three out of four respondents (75%) said the ministry's efforts to work with community leaders on the response were either very satisfactory or satisfactory. Again, there were significant gender differences: females (69%) were more likely to report

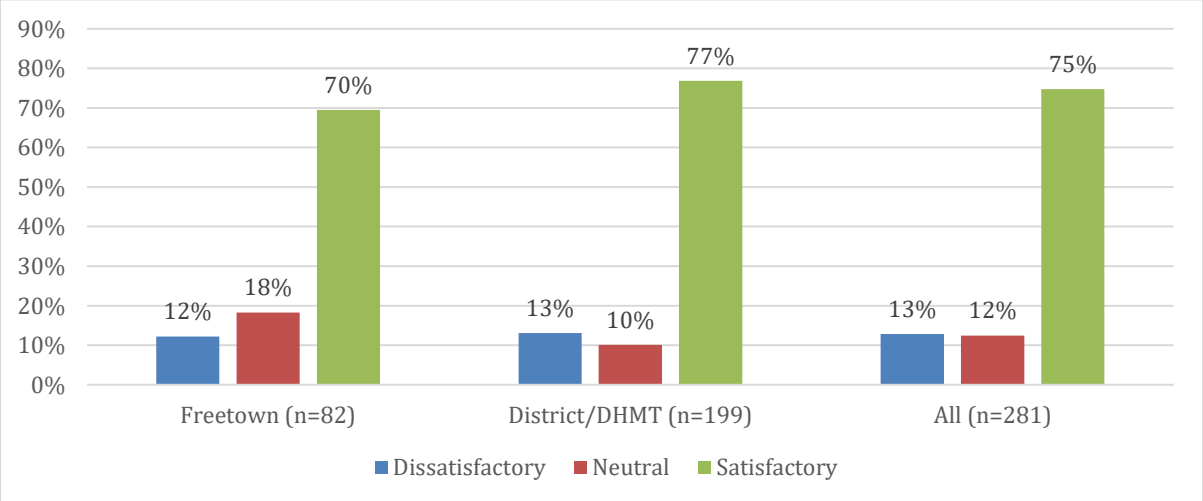
lower levels of satisfaction with MOHS efforts to work with community leaders than males (77%), suggesting yet another avenue of marginalisation for women (Figure 37).

Figure 37: Percentage of respondents that gave a satisfactory assessment of the MOHS's efforts to work with local community leaders, by gender (n = 281)



A lower percentage of non-MOHS (71%; n=41) respondents than MOHS respondents, and permanent (75%; n=210) than temporary (77%; n=30) staff, said the ministry's efforts to work with local leaders were satisfactory or very satisfactory. Among MOHS respondents, those at Grade 10 or above (71%; n=46) were less likely than those below Grade 7 (77%; n=74) or between Grades 7 and 9 (75%; n=46) to assess the MOHS's efforts to engage community leaders as satisfactory. A lower percentage of Freetown-based (70%; n=82) than district/DHMT (77%; n=199) respondents said the MOHS's efforts to work with communities were outstanding or met expectations (Figure 38).

Figure 38: Percentage of respondents that gave a satisfactory assessment of the MOHS's efforts to work with local community leaders, by location (n = 281)

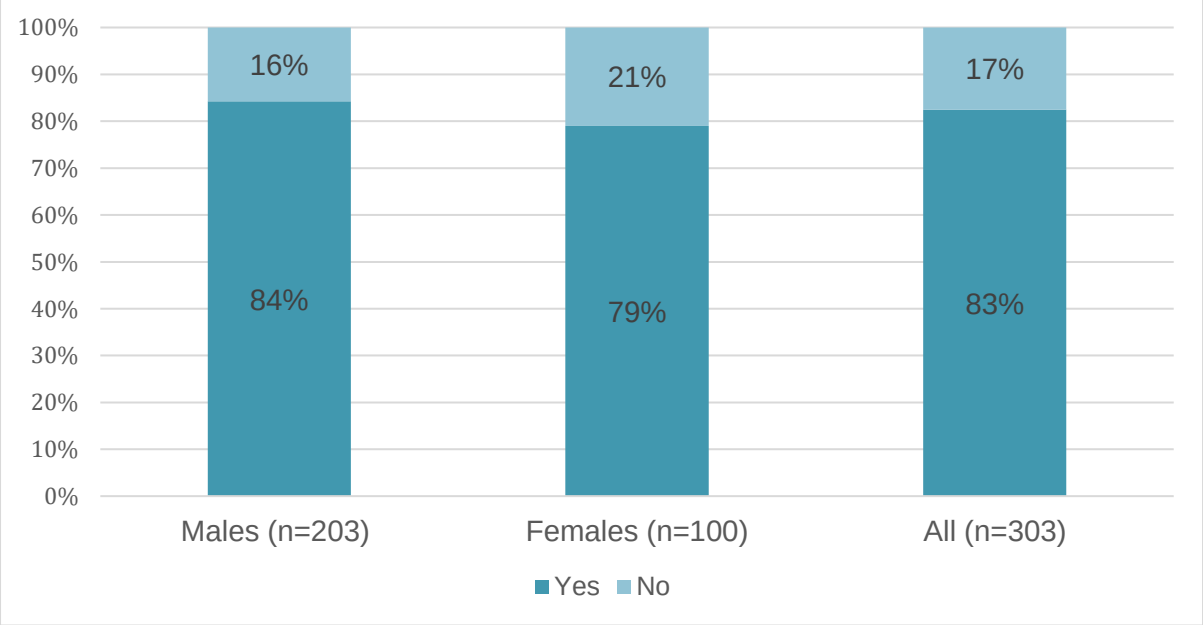


A higher proportion of health facility (78%; n=111) than non-health facility (72%; n=170) respondents gave a satisfactory or very satisfactory assessment of the ministry's efforts to engage with community leaders. However, these differences were not statistically different from zero.

2.4.8 Thinking about community engagement, do you think that the lessons learned from Ebola are being applied?

Overall, most respondents felt that the lessons from Ebola were applied to the COVID-19 response in terms of community engagement, with four out of five respondents responding positively to this question. More males (84%) than females (79%) said the lessons learned from Ebola were applied (Figure 39).

Figure 39: Percentage of respondents that reported that community engagement lessons learned from Ebola were applied to the COVID-19 response, by gender



When analysed by employment status of respondents, a slightly higher proportion of non-MOHS respondents (88%; n=43) than MOHS permanent employees (81%; n=227) said the lessons learned from Ebola were applied. Among the permanent staff of the ministry, four out of five respondents said community engagement lessons learned from Ebola were applied to the COVID-19 response. There were no statistically detectable differences across grades. A slightly higher proportion of Freetown-based (84%) than district/DHMT (82%) respondents said the lessons learned from Ebola were applied.

There were no statistically significant differences between health facility (83%; n=118) and non-health facility (82%; n=185) respondents on the application of the lessons learned from Ebola to the COVID-19 response. Four out of five health facility and non-health facility respondents said the lessons learned were applied. This sense that Sierra Leone leveraged its Ebola experience in its COVID-19 response has also been echoed by others, both nationally and internationally [33, 37].

2.4.9 What can be done to make the COVID-19 response more responsive at the community level?

As part of our overall approach to understand the systemic issues related to building health system resilience, the responses to this question were coded using the nine building blocks of the health system as key themes. The main issues raised are highlighted below and are grouped under the affected health system strengthening pillars.

Community participation: Most of the solutions cited were under the community ownership and participation pillar. Most respondents indicated a need to strengthen community ownership and participation in the response (making up well over half of the responses). Towards this end, respondents talked about the need for greater community sensitisation. They called for the inclusion of key stakeholders, such as community leaders and youth (among others), as well as the provision of stipends to encourage ownership of the response. Some examples of responses include the following:

> *'I recommend community involvement in whatever response the district response team does. The community structures like the religious leaders, traditional leaders, traditional birth attendants (TBAs) and community social mobilisation structures should be fully used. There should be a community stakeholders training on how to report, trace contact, isolate, or on every response strategy that is required at community level. Let them do all those and try to put ambulance service in place to refer any COVID-19 suspected case. At facility level, we expect them to be well equipped with personal protection equipment necessary for COVID-19 response.'*

> *'Ensure the community people own the fight and train more community health workers to lead the response as community people will listen and abide more to what their own people will say than a total stranger.'*

As can be seen from the above, the respondents indicated the importance of putting community members at the centre of sensitisation efforts, including ensuring the inclusion of key community leaders as well as involving general members of the community to address issues of trust. Authors such as Grieco (2020) have suggested that community involvement was not as robust, or as institutionalised, in the COVID-19 response as it was during Ebola [38].

Leadership and governance: A good number of respondents also pointed to the need for the development of community-level by-laws, as well as enforcement of the same. Respondents also called for greater decentralisation of the response, with more resources and tools provided at the community level. Several respondents pointed to the need to depoliticise the response, as well as to enforce COVID-19 regulations. Respondents expressed a desire for pandemic structures such as NaCOVERC and DiCOVERCs to be left in place permanently. They also mentioned the need for community participation on these committees. Respondents pointed to the need for more coordination to be done by the district-level structures and the DHMTs.

Health service delivery: A few respondents pointed to the need to ensure that health facilities were properly equipped and that there were adequate logistics, such as fuel and transport for surveillance as well as social mobilisation. The need for the proper health infrastructure and equipment at health facilities was mentioned frequently. Respondents asked for testing

centres, testing kits, as well as other resources to be provided at the district level, and for the integration of the COVID-19 response with regular health service delivery at both district and national levels.

Human resources for health: The training of health staff was most frequently mentioned under this pillar, including training of CHWs. Respondents also discussed ensuring that health workers receive their salaries and incentive payments promptly.

Health financing: The need for adequate funding of the response was most frequently mentioned. It was suggested that adequate funding is required to ensure (among other things) that logistics for the response are in place; thus, funding was mentioned more often when talking about the challenges to the health system.

Health information systems: There were very few responses related to health information – comments were more general, around the need to strengthen information, education, and communication efforts through print and radio media.

Health technologies: Ensuring an adequate drug supply was most frequently mentioned under this pillar, followed by laboratory testing, including strengthening the testing capacity at the district level. A few respondents also mentioned the provision of PPE and other IPC materials.

2.5 Service delivery

The ability to absorb a health shock, and to adapt or transform its operations after a health shock, are the hallmarks of a resilient health system. Thus, a resilient health system should have the capacity to mount an effective clinical and public health response to health emergencies while maintaining high-quality essential services across the continuum of care. Our aim in this section of the study was to find out how service provision was affected by the COVID-19 pandemic, and how the health system responded to the health shock, based on the opinions of respondents, especially frontline workers.

2.5.1 Thinking about primary healthcare delivery, how would you rate the effect of the COVID-19 pandemic on primary health service provision?

Respondents were asked to rate the effect of the pandemic on a four-point scale (1 = no effect, 2 = minor effect, 3 = moderate effect, and 4 = major effect). Key findings are highlighted below. The average rating of the effect of the pandemic on service delivery was 3.3 (SD = 0.69). When classified by sex, males (3.3) rated the effect of the pandemic slightly higher than females (3.2). Respondents below 35 years of age rated the effect of the pandemic higher (3.7) than any other group, second only to district/DHMT respondents (3.4). The results for various groups are shown in Table 6.

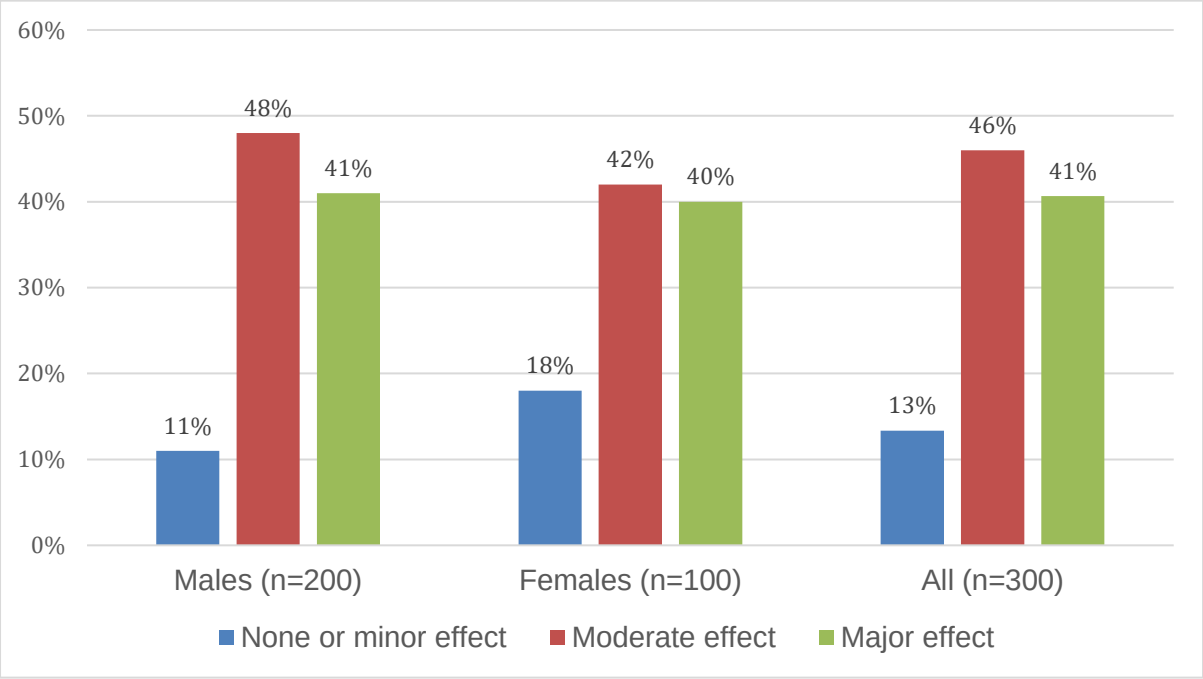
Table 6: Respondents' rating of the effect of the COVID-19 respondent on primary health service provision (n = 300)

Variable	Category	N	Mean	SD
Gender	Males	200	3.3	0.66

	Females	100	3.2	0.76
Age	21–34 years	71	3.7	0.66
	35–49 years	159	3.2	0.67
	50 years and above	70	3.2	0.76
Employment status	Permanent staff	224	3.3	0.7
	Temporary staff	33	3.2	0.58
	Non-MOHS staff	43	3.1	0.7
Salary grade (MOHS permanent staff only)	Grades 1 to 6	77	3.4	0.69
	Grades 7 to 9	97	3.3	0.72
	Grade 10 and above	50	3.2	0.7
Location	Freetown	92	3.1	0.75
	District/DHMT	208	3.4	0.65
Duty station	Health facility	116	3.3	0.69
	Non-health facility	184	3.2	0.69
All		300	3.3	0.69

Analysis of the responses by the proportion of respondents that rated the effect of the pandemic on health service delivery showed similar results. Less than half of all respondents (46%; n=300) said COVID-19 had a major effect on service delivery. Approximately 41% said it had a moderate effect. Almost an equal proportion of males (41%; n=200) and females (40%; n=100) said the pandemic had a major effect on primary healthcare service delivery (Figure 40).

Figure 40: Respondent's rating of the effect of the COVID-19 pandemic on primary service delivery, by gender

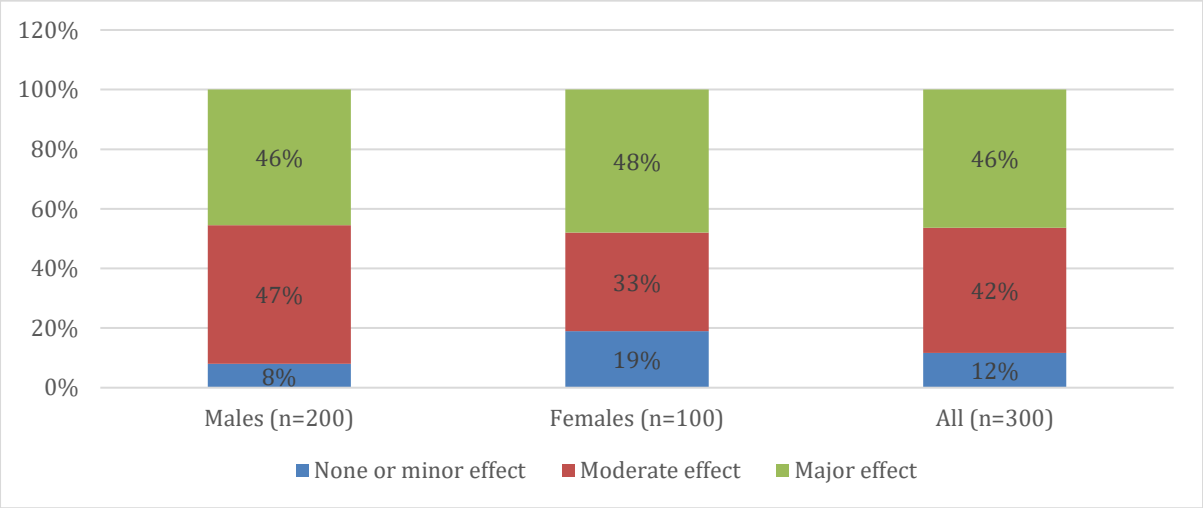


Permanent MOHS respondents (45%; n=224) were more likely than non-MOHS respondents (30%; n=43) to report that the pandemic had a major effect on primary service delivery. There were statistically significant differences (p = 0.008) between Freetown-based and district/DHMT respondents in their assessment of the effect of COVID-19 on primary healthcare service delivery. For example, Freetown-based respondents (22%; n=92) were more than twice as likely as district/DHMT respondents (9%; n=208) to state that COVID-19 had no or a minor effect on service delivery. A higher percentage of district/DHMT (45%) than Freetown-based (31%) respondents stated that COVID-19 had a major effect on service delivery. A slightly higher percentage of health facility (46%) than non-health facility (41%) respondents said COVID-19 had a major effect of primary healthcare service delivery, but the differences were not statistically different from zero.

2.5.2 Thinking about the operation of government hospitals, what do you think is the effect of the COVID-19 pandemic on the provision of health services at district and regional hospitals?

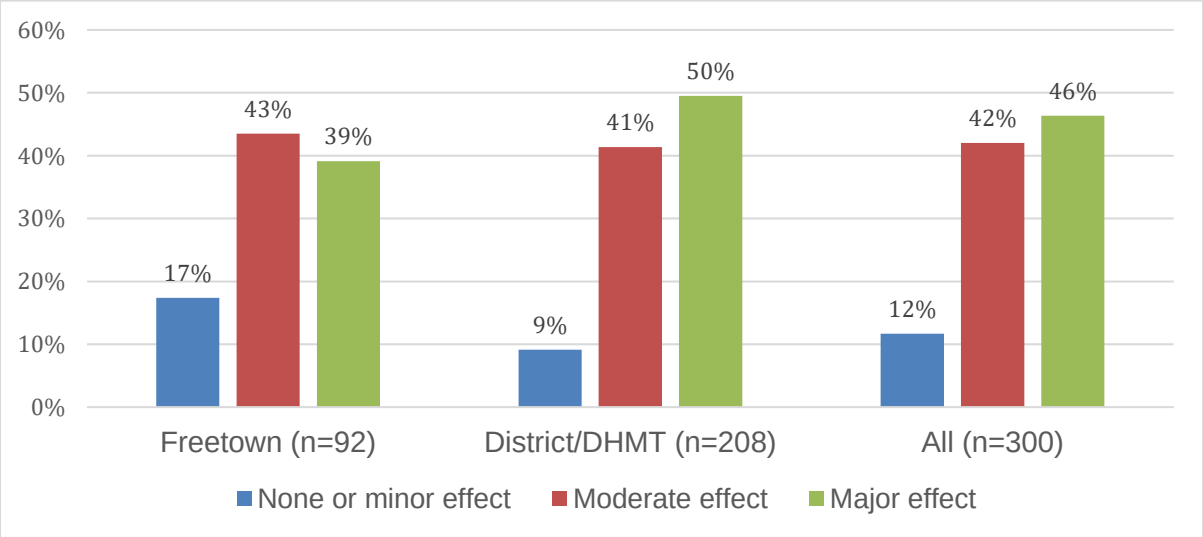
In addition to primary care service delivery, we also asked respondents to rate the effect of the pandemic on tertiary service delivery. Responses were measured on a four-point scale (1 = no effect, to 4 = major effect). Overall, 46% of respondents (n=300) said COVID-19 had a major effect on tertiary health service delivery, five percentage points higher than for primary healthcare. More females (48%; n=200) than males (45%; n=100) said COVID-19 had a major effect on the provision of health services at district and regional hospitals. Alternatively, males were more likely (47%) than females (33%) to state that COVID-19 had a moderate effect on tertiary service delivery. The differences between males and females in the assessment of the effect of COVID-19 on tertiary service delivery were statistically detectable (p = 0.007) (Figure 41).

Figure 41: Respondents' perceptions of the effect of the COVID-19 pandemic on the provision of health services at district and regional hospitals, by gender



A lower percentage of non-MOHS (35%; n=43) respondents than permanent MOHS employees (49%; n=224) who responded to the survey said COVID-19 had a major effect on service delivery, but the differences were not statistically different from zero. Among the permanent staff of the ministry, junior staff below Grade 7 (52%; n=77) were more likely than staff between Grades 7 and 9 (48%; n=97) and staff at Grade 10 or above (44%; n=50) to report that COVID-19 had a major effect on service delivery at district or regional hospitals. Differences among salary grade levels were not statistically discernible. A higher percentage of district/DHMT (50%; n=208) than Freetown-bases (39%; n=92) respondents said COVID-19 had a major effect on tertiary health service delivery. A higher proportion of health facility (50%; n=116) compared to non-health facility respondents (46%; n=184) reported that the pandemic had a major effect on tertiary health service delivery (Figure 42).

Figure 42: Respondents' perceptions of the effect of the COVID-19 pandemic on the provision of health services at district and regional hospitals, by location



2.5.3 How would you rate the ability of the MOHS to ensure that all PHUs at community level are able to provide health services during the COVID-19 pandemic?

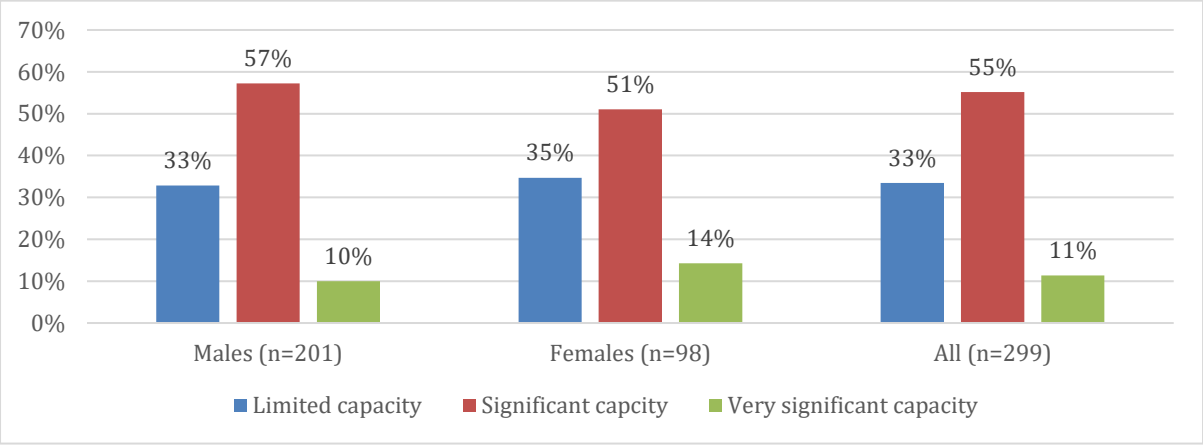
Most respondents, across all subgroups, acknowledged some level of service disruption at all levels of care. We asked respondents to rate the capacity of the MOHS to provide primary healthcare during the pandemic to gauge their perceptions of health system resilience during the health shock. Respondents were required to rate the ability of the ministry to maintain essential health service functions on a five-point scale (1 = no ability, to 5 = very significant ability). The mean capacity score for all respondents was 3.8 (SD=0.63), measured on a five-point scale (Table 7). This translates to a 76% capacity rating on a percentage scale. None of the respondents said the MOHS had no ability, implying that the ministry was scored at least a two by all respondents on capacity to maintain functions during the pandemic.

Table 7: Mean scores on the MOHS's capacity to maintain functions during the pandemic, classified by subgroups (n =299)

Variable	Category	N	Mean	SD
Gender	Males	201	3.77	0.61
	Females	98	3.80	0.67
Age	21–34 years	69	3.86	0.67
	35–49 years	159	3.75	0.62
	50 years and above	71	3.76	0.62
Employment status	Permanent staff	224	3.76	0.62
	Temporary staff	33	3.91	0.68
	Non-MOHS staff	42	3.79	0.68
Salary grade (MOHS permanent staff only)	Grades 1 to 6	75	3.84	0.68
	Grades 7 to 9	97	3.67	0.59
	Grade 10 and above	52	3.81	0.56
Location	Freetown	91	3.74	0.59
	District/DHMT	208	3.80	0.65
Duty station	Health facility	116	3.73	0.66
	Non-health facility	183	3.81	0.61
	All	299	3.78	0.63

Overall, two out of three respondents (67%; n=299) said the MOHS had a significant or a very significant capacity to maintain essential health service delivery during the pandemic. The same proportion of males (67%; n=201) as females (66%; n=98) said the MOHS had a significant or a very significant capacity to maintain its essential functions during the pandemic (Figure 43).

Figure 43: Respondents' rating of the capacity of the MOHS to maintain service delivery at PHUs during the COVID-19 pandemic, by gender



A slightly lower percentage of non-MOHS respondents (64%; n=43) compared to permanent MOHS employees (66%; n=224) said the MOHS had the capacity to deliver essential health services during the pandemic, but the differences were not statistically different from zero.

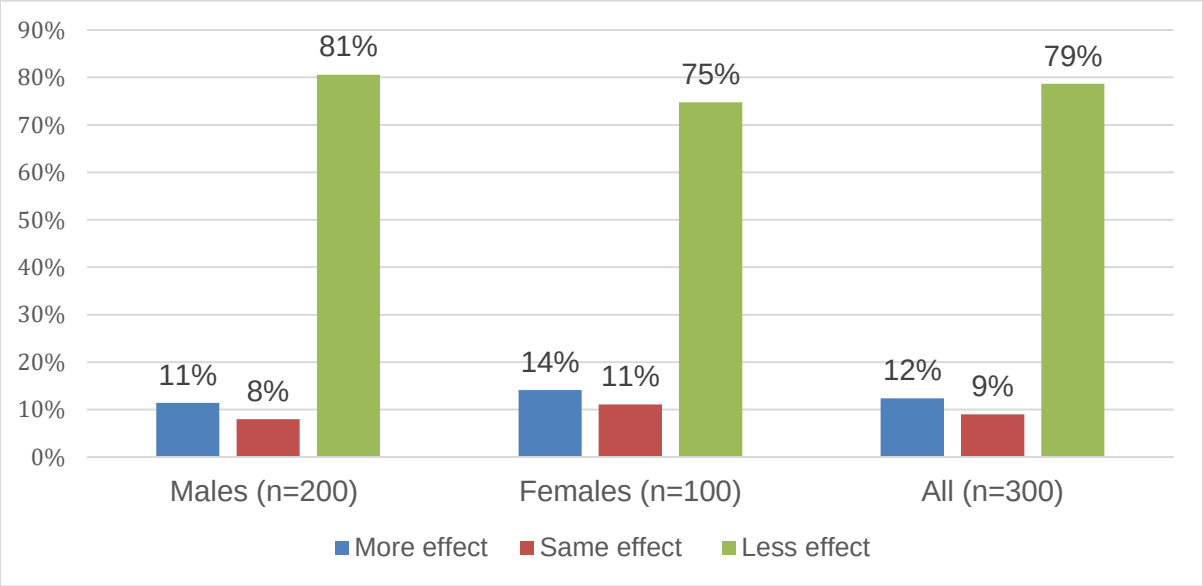
Among the permanent staff of the ministry, a higher proportion of the senior staff at Grade 10 or above (73%; n=52) than those below Grade 7 (67%; n=75) or between Grades 7 and 9 (61%; n=97) reported that the ministry had the capacity to maintain essential health service delivery during the pandemic. The proportion of district/DHMT (67%; n=208) and Freetown-based (66%; n=91) respondents that said the MOHS had a significant or a very significant capacity to maintain primary healthcare service delivery was almost the same. A lower percentage of health facility (61%; n=116) than non-health facility (70%; n=183) respondents said the MOHS had the capacity to maintain essential health service delivery at PHUs during the pandemic.

2.5.4 How would you compare the effect of COVID-19 on service delivery to that of Ebola?

Besides the civil war, the Ebola epidemic was the largest health shock Sierra Leone had faced in its history (prior to COVID-19). About 14,124 persons were infected, with 3,956 lives lost to the epidemic, including 221 healthcare workers. The decline in primary health service utilisation was estimated at 14% [6]. Although COVID-19 has been declared a pandemic, not every country or territory has been equally affected. In Sierra Leone, the loss of lives due to the pandemic has been relatively minimal to date, but the extent of disruptions to service delivery due to the pandemic has not been well documented. Thus, we asked respondents how the effect of the COVID-19 on primary health service delivery compared with Ebola, as part of the overall attempt to estimate the effect of the pandemic on service delivery.

Overall, three out of four (79%; n=300) respondents said the COVID-19 pandemic had less effect on service delivery compared to Ebola. A higher proportion of males (81%) than females (75%) reported that COVID-19 had less effect (Figure 44).

Figure 44: Percentage of respondents that said COVID-19 had less, the same, or more effect on service delivery compared to Ebola, by gender (n=300)



Permanent staff of the MOHS (79%; n=224) were as likely as non-MOHS (79%; n=43) respondents to report that COVID-19 had less effect on service delivery than Ebola. Among the permanent employees of the ministry, senior staff at Grade 10 or above (88%; n=50) were more likely than those below Grade 7 (74%; n=77) or between Grades 7 and 9 (77%; n=97) to report that COVID-19 had less effect than Ebola. Almost the same proportion of Freetown-based (79%; n=92) as district/DHMT (78%; n=208) respondents said COVID-19 had less effect on primary healthcare service delivery. A lower proportion of health facility (76%; n=116) than non-health facility (80%; n=184) respondents said COVID-19 had less effect on service delivery than Ebola. A UNFPA (2020) study found that while health workers had expressed concerns that COVID-19 would disrupt services, the study did not find evidence of disruptions based on family planning and maternal health attendance data [39].

2.5.5 Why do you say COVID has more, less, or the same effect compared to Ebola?

The main metrics used by the majority of the respondents to determine that COVID-19 had less effect than Ebola were the case fatality rate (i.e. the percentage of persons that died among those diagnosed with the disease), the level of preparedness of the health system, the awareness of the population about response to an epidemic, and the decline in health service utilisation during the two health shocks.

Most respondents felt that the health system was better prepared for COVID-19 than it was for Ebola, and that the government, along with the MOHS, took proactive measures early in the pandemic that resulted in less cases and deaths. They pointed to the building of awareness around COVID-19 even before the outbreak took place, as well as established structures that had been put in place. Many also said that while COVID-19 is more contagious, it is less deadly. Most respondents felt that the health sector had been able to continue functioning under COVID-19, with people willing to visit healthcare facilities. There were several respondents who also felt that the country had learned from its experience with Ebola and had been able to address some of the shortcomings in that response. While there were

some respondents that felt that healthcare-seeking during COVID-19 had decreased more than was the case during Ebola, they were not the majority. The small number that said Ebola had less effect than COVID pointed to some bottlenecks in the operation of the structures put in place for effective emergency response: for example, the need for more PPE and equipment, and the disparity in funding for the response, with more assistance from external actors during the Ebola outbreak than during COVID-19, when the government had to rely more on its own resources.

Box 1: Summary of reasons for respondents reporting that COVID had more, less, or the same effect compared to Ebola (in respondents' own words)

Case fatality rate

'While infectivity rate is high, the morbidity and mortality is low. Majority of the COVID-19 patients can be taken care of at home, if they are willing to observe the use of face mask, social distancing, and use of alcohol-based/hand sanitisers.'

'The death rate of Ebola was higher than that of COVID-19. We can live with COVID-19 but we cannot live with Ebola.'

Preparedness and response

'Awareness has been in place before the pandemic outbreak. Also, some established structures have been in place before the pandemic.'

'Government's earlier intervention on taking proactive measured in terms of the messaging and health tips to follow helped greatly.'

'The Ebola met our health system completely shattered and helped to damage it so badly. We had to pick up with the help of our donor partners. So there were so many health system strengthening programmes and that's why when COVID-19 come it was not a surprise to catch up.'

Awareness, knowledge, and lessons learned

'The knowledge and awareness of outbreak response is there among health staffs, while in the case of Ebola epidemic there was no ideas as to how to handle it.'

'There was so much sensitisation before we had the corona, and the health system was prepared a bit and there was not so much denial like we had during the Ebola so the effect of COVID-19 isn't severe.'

Health service utilisation

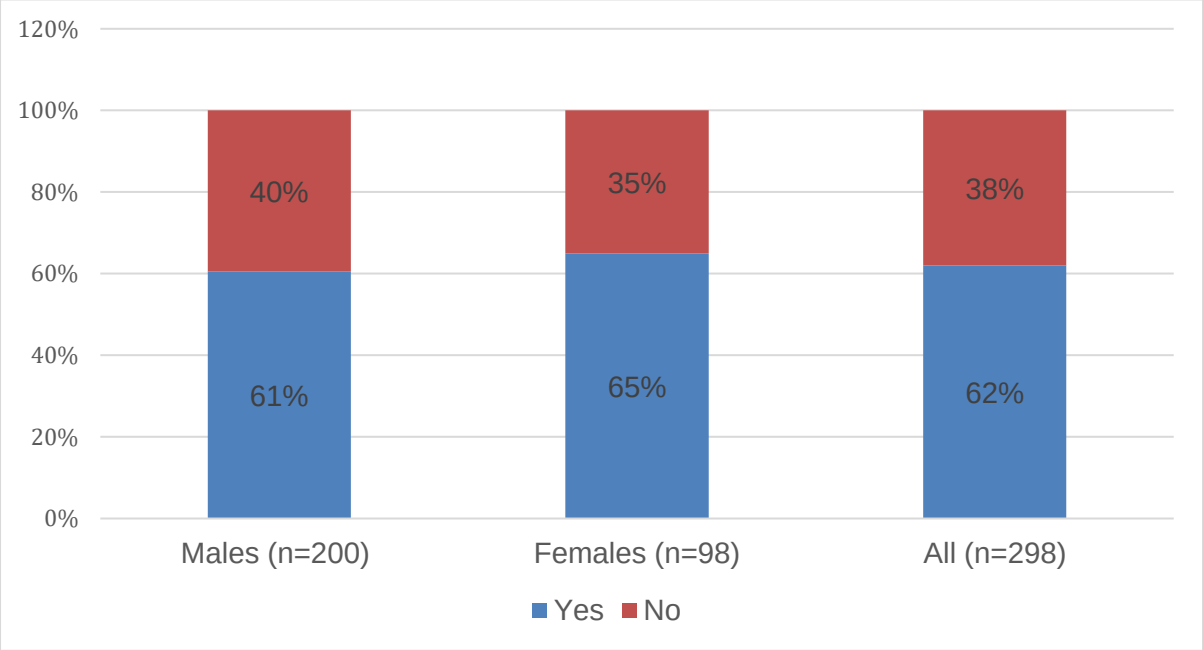
'Most people were afraid during Ebola that if they go to the hospital they will automatically die of the disease. But with COVID-19 people are still visiting health facilities.'

'During Ebola people did not go to hospital because of fear, so it created a lot of effect. Whereas during COVID-19 people did not completely shy away from hospital, some people went to the hospital, but with the fear of showcasing the actual signs and symptoms affecting them.'

2.5.6 As far as you know, are there adequate treatment and isolation facilities to isolate and treat current suspected or confirmed cases of COVID-19?

Overall, three out of five respondents (62%; n=298) said there were adequate treatment and isolation facilities to deal with suspected or confirmed cases of COVID-19. Slightly more females (65%; n=98) than males (61%; n=200) said there was enough treatment and isolation capacity to deal with COVID-19 cases (Figure 45).

Figure 45: Percentage of respondents that said there were adequate facilities to isolate and treat current suspected or confirmed cases of COVID-19, by gender

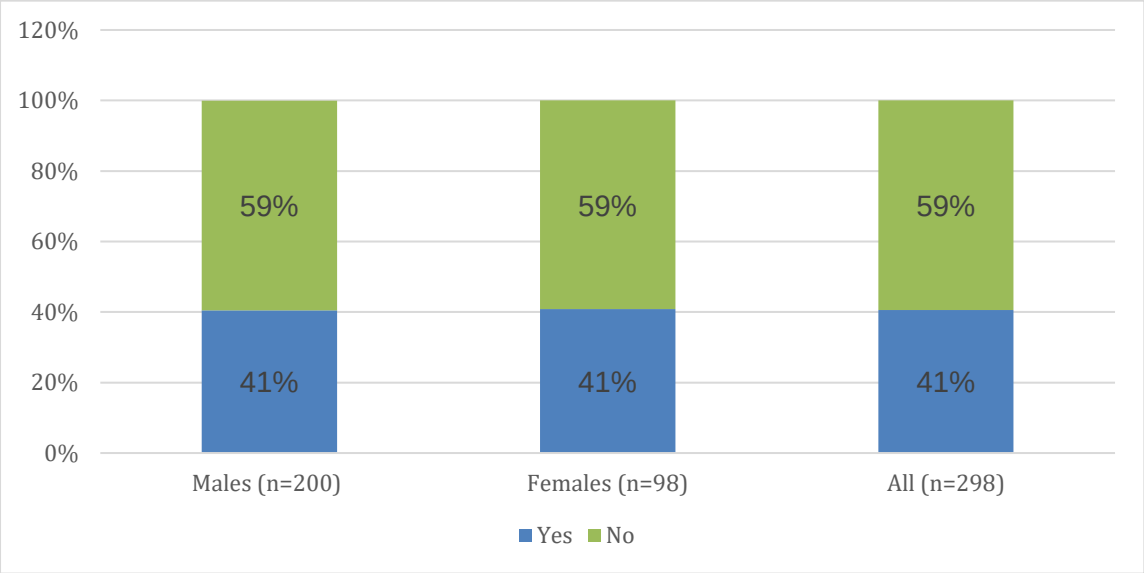


A significantly higher proportion of permanent MOHS employees (65%; n=222) than non-MOHS respondents (44%; n=43) said there were adequate treatment and isolation facilities to deal with COVID-19 cases (p = 0.035). Responses on the availability of facilities to treat and isolate COVID-19 cases did not significantly differ between health facility (65%; n=118) and non-health facility (60%; n=180) respondents. A higher proportion of Freetown-based (69%; n=88) than district/DHMT (59%; n=210) respondents said there were adequate facilities to deal with COVID-19 cases.

2.5.7 If the number of suspected or confirmed cases of COVID-19 were to increase like was the case with the Ebola epidemic, are there adequate treatment and isolation facilities?

Overall, only two out of five respondents (41%; n=298) said there were adequate treatment and isolation facilities available to manage a surge in COVID-19 cases to the level of the Ebola epidemic. The same percentage of males (41%; n=200) as females (41%; n=98) said there was adequate capacity to manage a surge (Figure 46).

Figure 46: Percentage of respondents that said there was adequate capacity to deal with an increase in suspected or confirmed COVID-19 cases, by gender



A higher proportion of MOHS permanent employees (43%; n=222) than non-MOHS respondents (28%; n=43) said there was capacity to manage a surge in COVID-19 cases. Among the permanent employees of the ministry, a lower percentage of senior staff at Grade 10 or above (37%; n=50) than those below Grade 7 (49%; n=76) or at Grades 7 to 9 (42%; n=96) said there was adequate surge capacity. There were statistically significant differences (p =0.033) between Freetown-based and district/DHMT respondents on the availability of surge capacity to deal with an increase in cases. One out of two Freetown-based respondents (50%; n=88), compared to two out of five district/DHMT respondents (37%; n=210), said there was adequate surge capacity. A lower percentage of health facility (39%; n=118) than non-health facility (43%; n=180) respondents reported that there was adequate capacity to deal with a surge in COVID-19 cases. However, the differences were not statistically discernible. Although carried out early in the outbreak and focusing on 14 healthcare institutions in urban and peri-urban communities, the UNFPA report (2020) released in July 2020 noted that while many health workers had received training, and surveyed hospitals had triage and isolation facilities available, UNFPA did not note any equipped isolation rooms, and only three of the seven surveyed clinics had equipped isolation rooms [39]. This supports the finding that while there was some level of preparedness, there was still considerable room for improvement.

2.5.8 In your opinion, what are the main challenges to the provision of essential health services during the COVID-19 pandemic?

Respondents provided open-ended answers to this question, which are analysed and summarised below. The challenges to the health system delivery during the COVID-19 response were systemic, affecting all nine building blocks of the health system [40]. The main challenges have been organised by the nine building blocks of the health system, as listed below in order of frequency of mentions:

1. medical supplies, equipment, and health technologies;
2. human resources for health;

3. service delivery;
4. community participation;
5. leadership and governance;
6. health information;
7. financing;
8. research and surveillance; and
9. health partnership.

Table 8: Summary of the main challenges that affected service delivery during the COVID-19 pandemic.

1. Medical supplies, equipment, and medical technologies	**5. Leadership and governance**
● Interrupted supply of PPE	● Existence of parallel institutions
● Delays in the delivery of drugs and medical supplies	● Limited supervision of response
● Inadequate availability of essential drugs	● Inadequate district-level preparedness and response
● Inadequate availability of medical supplies and equipment	● Limited coordination of the response
● Shortages of laboratory kits, and materials	**6. Health information**
2. Human resources for health	● Denial of the existence of COVID-19
● Delayed or low incentives	● Inadequate sensitisation
● Limited training of the available staff	● Ineffective messaging
● Inadequate personnel to meet the needs of the response	**7. Health financing**
● Lack of insurance for healthcare workers	● Inadequate funding
3. Health service delivery	● Impact of COVID-19 on donor countries and on domestic revenue generation
● Underutilisation of health services	**8. Research and surveillance**
● Limited or unconducive isolation centres to isolate suspected cases	● Poor management of quarantine and isolation centres
● Interruptions in healthcare referral pathway	● Limited surveillance capacity
● Interruptions in continuity of patient care	● Inadequate port of entry monitoring
4. Community participation	**9. Health partnerships**
● Limited awareness of and adherence to health protective practices	● Inadequate donor funding
● Inadequate communication about the disease, including mode of transmission and health risks	● Limited donor partners
● Limited involvement of community stakeholders	● Over-reliance on donor funding

Medical supplies, equipment, and health technologies: Many of the respondents cited problems with drugs and medical supplies. Specifically, most of the respondents reported that IPC materials were in short supply. Medical and pharmaceutical supplies for emergency

operations were not readily available in sufficient quantities. This was also true of essential laboratory supplies for the delivery of essential services. The laboratory testing of suspected COVID-19 cases was constrained by a lack of testing materials, resulting in delays in the reporting of results. A few respondents mentioned that specimen transportation was hampered by transport constraints.

Human resources for health: The human resource capacity to respond to the pandemic was regarded as inadequate. The emergency response workforce was considered to be inadequately incentivised: most of the respondents reported that incentives in the form of risk allowances were low, or delayed. Many of the respondents reported that there were inadequate personnel to meet the needs of the response, particularly to manage a surge. Some reported that the personnel available were not adequately trained. A few respondents mentioned the lack of health insurance for frontline workers as a risk to personal health and a challenge to providing care during a pandemic.

Service delivery: The majority of the respondents reported that there was underutilisation of health services because some people were not visiting health facilities for fear of contracting COVID-19. According to one respondent: '*Patient are afraid to come to the hospital for treatment. Pregnant women are also afraid to come to the hospital to put to bed*'. Temporary health facilities for the treatment and isolation of suspected COVID-19 cases were either not available in some health facilities or were ill-equipped to meet the needs. Some respondents reported that continuity of the referral system was challenged by the reallocation of ambulance services to the COVID-19 response. According to one respondent: '*there was negative impact on emergency referrals for non-COVID cases since ambulances were withdrawn from the pool of ambulances for COVID-specific activities*'. A few respondents mentioned that regular service delivery was neglected due to COVID-19, which undermined the continuity of patient care. Similarly, as discussed earlier, a UNFPA (2020) study found that healthcare workers expressed concerns that patients were avoiding hospitals due to fear of contracting COVID-19, but the study did not find this supported by attendance data, specifically on maternal health and family planning, although it noted the importance of monitoring the data to note if challenges might emerge [39]. Similarly, Buonsenso *et al.* (2021) noted that malaria diagnoses continued after sensitisation encouraging hospital attendance, after an initial drop at the start of the outbreak [41].

Community participation: Inadequate community engagement in the discussion about the local, national, and global implications of COVID-19 was reported to be a challenge to service delivery during the pandemic. The majority of the respondents reported that there was limited community awareness of health protective practices for COVID-19. Some respondents reported the need to improve on the communication of health risks. For a small number of respondents, local leaders, including traditional leaders, were not adequately involved in the response.

Leadership and governance: The existence of '*parallel institutions with ill-defined terms of references*' to manage the response was identified as one of the main governance issues affecting the COVID-19 response. According to one respondent: '*the absence of a health emergency response institution established by law*' and mandated to manage health emergencies encouraged the creation of multiple institutions. The existence of parallel structures resulted in a lack of clarity and delays in information. There was a concern among some respondents that the management of COVID-19 was mainly in the hands of non-medical

practitioners. One respondent said: '*More premium was given to the political appointees than the health workers in the fight against COVID-19*'*.* A few respondents mentioned the need for improvement in the supervision and control of COVID-19 response materials, to ensure that materials and medicines reach communities at the right time. To improve control and supervision, one respondent suggested establishing '*care control centres in all hospitals*. There was also a perception that the response could have been timelier, better organised, and better coordinated. It was also reported that the response at the district level was relatively slow because the DHMTs were not adequately prepared, and because the MOHS was slow in mobilising resources for the response.

Health information: The challenges highlighted by the respondents indicate the need for improved risk communication to empower individuals to make informed decisions. The majority of the respondents reported that there was denial of the existence of COVID-19, fear of using health facilities for non-COVID-19 illnesses, lack of understanding of COVID-19, resistance to mask-wearing, fear of being tested for COVID-19, entrenched unfavourable traditional and cultural beliefs and practices, and fake news about the pandemic. Several respondents cited inadequate sensitisation and ineffective messaging as main challenges and suggested improved risk communication to correct misconceptions and '*reassure communities of their safety when they visit health facilities*'.

Health finance: Inadequate funding was one of the main challenges to the response cited by the majority of the respondents. According to one respondent: '*Inadequate resources, both human and financial, posed a significant challenge to the provision of essential services during the outbreak*'. Some respondents pointed out that because most of the partner countries were also affected by COVID-19, limited support could be expected from them. A few respondents pointed out that the economy was seriously challenged in the fight against the COVID-19 pandemic. The policy measures put in place to fight the pandemic resulted in a decline in tax revenue and the availability of domestic resources to fund the response.

Research and surveillance: No research-specific challenges were identified. The major challenges to disease surveillance that were cited were poor quarantine home management, unavailability of isolation centres at various health facilities, and inadequate point of care monitoring. Most of the respondents pointed out that isolation centres were not available, particularly in hard-to-reach communities, and even in facilities where there were isolation centres, they were not always conducive or secured. Some respondents said that quarantined or isolated people were '*not receiving what they should receive in terms of care*'. Some reported that there was a shortage of water, food, and condiments, or a delay in supplies. According to one respondent: '*The food provided for people in quarantine places is not enough, facilities in quarantine homes are poor, and there is poor monitoring of the homes*'*.* Some respondents mentioned inadequate point of entry monitoring as a challenge.

Health partnerships: A few respondents mentioned specific challenges related to donor funding. Some respondents mentioned inadequate funding from donors and a few respondents mentioned that the number of donors to support the response was limited. A few respondents also mentioned an over-reliance by the MOHS on donor funding, and low commitment by the government to support the response in the absence of low donor inflows.

2.6 Health system strengthening

One of the main objectives of this study is to identify interventions that can be implemented to help the health system develop resilience. Thus, to identify gaps, and the building blocks of the health system that require more attention, respondents were asked to prioritise the building block of the health system that they would prefer to be the focus of a comprehensive intervention post-COVID-19.

2.6.1 After the COVID-19 pandemic, the health system may need strengthening in all areas but if you were asked to prioritise and choose ONLY one area for comprehensive intervention which of the following would you choose?

Overall, service delivery, drugs and medical supplies, research and surveillance, and human resources for health, respectively, were the top four priorities (Table 9). When analysed by gender, males and females did not differ on the top three priority areas for comprehensive intervention (i.e., service delivery, drugs and medical supplies, and research for health, respectively). District/DHMT and Freetown-based respondents also did not differ on the top three priority areas for comprehensive intervention (i.e., service delivery, drugs and medical supplies, and research for health, respectively). The senior staff of the MOHS chose service delivery, drugs and medical supplies, and health finance as the three top priority health system building blocks. Among the non-MOHS respondents, community participation was the top priority, and research for health and service delivery tied for the second priority area.

Table 9: Respondents' ranking of priority health system strengthening building blocks for a comprehensive intervention to develop health system resilience, by subgroups (n = 303)

	All	Males	Females	District/ DHMT	Freetown	Junior staff below Grade 7	Senior staff Grade 10 +	Health facility respondents	Non-MOHS respondents
Service delivery	23.8%	24.1%	23.0%	23.8%	23.7%	14.3%	34.0%	25.4%	16.3%
Drugs, medical supplies, and technologies	16.8%	16.3%	18.0%	14.3%	22.6%	28.6%	17.0%	20.3%	7.0%
Research for health	13.5%	14.8%	11.0%	13.3%	14.0%	9.1%	13.2%	14.4%	16.3%
Human resources for health	8.9%	8.4%	10.0%	9.5%	7.5%	10.4%	11.3%	8.5%	2.3%
Health information	8.3%	7.4%	10.0%	8.6%	7.5%	14.3%	1.9%	7.6%	7.0%
Community ownership and participation	7.6%	6.4%	10.0%	10.0%	2.2%	5.2%	3.7%	8.5%	18.6%
Health finance	7.6%	9.4%	4.0%	8.1%	6.5%	6.5%	15.1%	5.9%	4.7%
Partnerships for health development	7.2%	6.8%	8.0%	7.6%	6.3%	6.4%	.	5.9%	14.0%
Leadership and governance	6.3%	6.4%	6.0%	4.8%	9.7%	5.2%	3.8%	3.4%	14.0%
n	303	203	100	210	93	77	53	118	43

2.6.2 Which specific intervention(s) or activities do you think, if implemented effectively, could help to ensure that any time there is an outbreak, the health system is able to maintain its service functions?'

Respondents were asked to list the specific issues that motivated their selection of the priority building blocks for a comprehensive intervention. A two-level coding structure was applied: responses were coded according to the nine building blocks at the first level; where appropriate, the more specific issues were coded at the second level, and the number of times the issues were mentioned was scored.

Overall, activities related to human resources for health were the most often mentioned, followed by service delivery, and drugs, medical supplies, and health technologies. The majority of the respondents that selected service delivery mentioned the need to strengthen health workforce capacity to ensure effective service delivery.

Human resources for health: Training and education of the health workforce was the most often mentioned human resources for health issue. Specifically, most of the respondents mentioned training on emergency response, and service delivery. The most often mentioned training-related phrases were: '*more training on disease outbreaks*'; '*strengthen the emergency response teams*'; '*adequate training*', and '*regular refreshers training for health workers*'. Salaries and incentives were the second most often mentioned human resource issues. Specifically, improvement in incentives, and timely payment of salaries were the specific issues related to health workforce motivation and retention that were identified. Additionally, a few respondents mentioned that '*there should be attractive health insurance for health workers*'.

Table 10: Summary of specific suggested interventions to improve health system resilience to health shocks by health system strengthening building blocks.

Building block and listed activities		Frequency
1	**Human resources for health (n =148)**	
	Training and education	80%
	Salaries and incentives	9%
	Recruit more staff	7%
	Effective human resources management	3%
2	**Service delivery (n=114)**	
	Functional health infrastructure	23%
	Isolation and treatment centres for outbreak response	18%
	Public health agency	8%
	Strengthen emergency service delivery	14%
	Patient safety/IPC	8%
	Improve service delivery for continuity of essential health services	30%
3	**Drugs, medical supplies, and health technologies (n=93)**	

	Medical equipment and supplies for emergencies and normal service delivery	58%
	Pharmaceuticals/drugs	30%
	Laboratory services	12%
4	**Community participation (n =62)**	
	Community ownership	39%
	Training of CHWs and community leaders	16%
	Social mobilisation	37%
	Community capacities/structures for emergency preparedness and response	8%
6	**Research for health (n =50)**	
	Research for health	38%
	Surveillance	62%
5	**Leadership and governance (n =49)**	
	Support to DHMTs	16%
	Supervision/coordination	14%
	Functioning of national and district response committees	6%
	Planning, preparedness, and swift response	37%
	Regulatory development and enforcement	4%
	Overall leadership and governance	22%
7	**Health information (n=34)**	
	Health information	100
8	**Financing (n = 20)**	
	Funding for health system	75%
	Standby funding for emergency response	25%
9	**Partnerships for health and development (n=5)**	**100%**

Service delivery: The most often listed service delivery activities were related to the need for the continuity of essential health programmes and services during or after an emergency. The majority of respondents called for a general '*improvement in service delivery*', while some listed specific issues, such as '*strengthening the referral system*', '*more ambulances to reach communities in need*', '*supporting the implementation of the basic package of essential health services (BEHPS)*', '*strengthening quality of care at all levels*', and '*more focus on infection preventive control in all health facilities'.*

The need to develop appropriate, relevant, and functional health infrastructure for continuity of essential services was also frequently mentioned. The majority of respondents cited the need for new infrastructure development, strengthening hospitals and PHUs by providing them with the basic requirements for improved service delivery, and improving the existing health infrastructure in every district.

The majority of the respondents listed activities related to building emergency response capacity and capability. Many respondents called for the construction of permanent isolation and treatment centres at all service delivery levels to manage outbreaks. According to some respondents, there is a need to: '*set up regional infectious disease units with staff and equipment to handle infectious diseases during and outside an outbreak*', '*ensure fit for purpose and functional isolation centres in all districts*', '*set up permanent district response structures in case of any emergency outbreak*', and '*build functional emergency operation centres (EOC) at district level with permanent structures*'. Some respondents called for the establishment of a '*national public health agency charged with the responsibility of preventing, detecting and responding to events of public health concern*'. In addition to coordinating outbreak response, it was suggested that the agency could also be responsible for conducting preparedness and emergency response research. A few respondents called for '*strengthening the emergency response*', for example through the formation of '*emergency response teams*', equipped to rapidly respond to health emergencies, and through '*strengthening case management*'.

Drugs, medical supplies, and health technologies: The majority of the specific activities related to drugs, medical supplies, and health technologies were concerned with good supply chain management to ensure timely and adequate supply of drugs and medical logistics for emergencies and normal service delivery. Examples of the listed activities included: '*adequate medical supply for every patient to prevent stock out*', '*timely provision of medical supplies and technology*', '*provision of adequate PPEs*', '*ensure adequate materials to respond to emergencies are always available*', '*provide more drugs to all health centres*', and '*effective procurement machinery should be in place*'. Many respondents cited the need for improvement in laboratory services. There were calls for: '*improvement in the functionality of district laboratories*', '*the construction of sustainable and permanent laboratory facilities across all districts for any future outbreak*', and improvement in laboratory testing capacity in all districts.

Community participation: The majority of the respondents listed community ownership as a building block requiring intervention, without being more specific. However, those who listed specific activities mentioned social mobilisation, raising community awareness of health shocks, health education, enforcement of by-laws, and effective behaviour change communication. Some respondents listed the development of community human resources, particularly the training of CHWs and community leaders in emergency response and service delivery, as specific activities to be implemented. A few respondents mentioned building community structures for emergency preparedness and response. Specific activities mentioned included '*building community care centres*', and '*emergency response structures with appropriate leadership at chiefdom level*'.

Research and surveillance: A few specific activities related to health research were listed. There were calls for '*more and continuous health research*' to ensure that '*preparedness and response are always evidence based*', '*to provide evidence on where to put more attention*', and '*to help minimise the mistakes of previous outbreaks*'.

Leadership and governance: The majority of the leadership and governance activities listed by respondents were concerned with planning, preparedness, and swift response to health shocks. Some of the most often mentioned activities included: *'outbreak response should be embedded in the health system*', '*there should be adequate preparedness and a swift*

response to any outbreak', '*the technical staff should be the front-runners in any outbreak response*', and '*ensure health system readiness at all times*'. Some respondents mentioned an increase in the support to DHMTs, although the nature of the support was not listed. A few respondents mentioned improvement in supervision, control, and coordination. A few respondents mentioned the effective functioning of national and district response committees. Specifically mentioned were the need to '*establish permanent emergency committees in all districts*', and '*the decentralisation of the public health emergency response*'.

Health information: The majority of the respondents that listed health information as an area for intervention did not specify the activities. The specific activities listed were related to improving risk communication, and the dissemination and sharing of information. Typical examples included: '*improve communication system for any public health emergency and outbreak'*, '*effective education messages*', '*information sharing for informed decision-making*', '*more health talks*', and '*health education should be paramount*'.

Health financing: Health finance is a cross-cutting issue that impacts all other building blocks of the health system. Nevertheless, a few respondents listed health financing as a specific issue for intervention. The few that identified health financing as an area for comprehensive intervention often listed '*inadequate funding of the health sector*' as a specific issue to be addressed. A few respondents suggested '*standby funding for emergency response*'.

Partnerships for health: Partnerships for health was the least mentioned building block for comprehensive intervention, although by no means the least important. Specific issues mentioned included: '*Encouraging more development partners to contribute to health system improvement*', and '*incorporating all partners, including international and local non-governmental organisations, in the emergency preparedness, response and service delivery*'.

2.7 Brief overall assessment of the COVID-19 response in the country

It would be premature to carry out a comprehensive analysis of the Government of Sierra Leone's COVID-19 response at this point in time, since the pandemic is ongoing. This is also not the purpose of this study. However, a few positive attributes of the response have already been identified. Some examples include the sustained awareness campaigns about the disease, good monitoring of border entry points, and the timely declaration of a state of emergency to mitigate disease spread.

Grieco and Yusuf (2020) have reported other public health measures, including social distancing and lockdowns by the government to avoid the spread of the disease. Other necessary measures were the requirement to use face masks and apply sanitary practices, to engage in frequent handwashing, and to practise social distancing in public spaces [36]. On the other hand, print and other social media outlets have cited things that could have been done better, such as the need to provide an adequate supply of PPEs and other basic supplies for those in quarantine, during the early stages of the pandemic.

According to Jalloh *et al*. (2021) these 'top-down approaches' to achieving protective behavioural changes during public health emergencies (including Ebola and COVID-19), such as border closures, school closures, and other government-instituted 'shelter-in-place' measures to avoid disease spread, while at times inevitable, can also produce unanticipated

negative results, especially for people in lower socioeconomic classes, whose subsistence living strategies require them to move about even during disease pandemics and epidemics, as they have no ability to keep food reserves at home [42]. Some of this was witnessed in Sierra Leone during the Ebola and COVID health emergencies, as thousands struggled to survive economically due to disease prevention policies imposed by the government. In both the Ebola and COVID-19 health emergencies, the government's response has improved over time as the authorities received and distributed more resources received from foreign and local sources.

3 Discussion

In the current study, we surveyed the Sierra Leone MOHS health workforce and stakeholders actively working with the ministry on the COVID-19 response to examine how effectively the health sector responded to the pandemic, with a specific focus on leadership and governance, the health workforce, community ownership and participation, and service delivery.

The study results indicate that the health sector to some extent applied the **lessons learned from previous outbreaks** to the COVID-19 response, and there are positive elements to this response. For example:

- One of the lapses of the 2014 Ebola response was the failure to react swiftly, because those involved 'failed to see some fairly plain writing on the wall' [43]. The **declaration of the state of emergency** by the Government of Sierra Leone following the outbreak of Ebola in 2014 was said to be delayed, which contributed to the escalation of the crisis and the loss of 4,000 lives [43]. In contrast, four out of five respondents surveyed said the declaration of the state of emergency following the COVID-19 outbreak was very timely or timely. Indeed, Sierra Leone reported the first case of COVID-19 on 30 March 2020, six days *after* the President of Sierra Leone declared a state of emergency [44].

- The **response structures** put in place during Ebola were swiftly reactivated. NaCOVERC was established at the national level and DiCOVERCs were established in all 16 districts, along with the technical response pillars, mirroring the Ebola coordination structures [36]. A multisectoral emergency response coalition of various stakeholders collaborated with the Office of the President in the effort to contain COVID, as proved to be necessary during the Ebola outbreak.

- **Travel restrictions** were swiftly put in place. Stringent entry port surveillance measures at Lungi and other border posts were put in place. These included entry port screening, monitoring, and quarantine arrangements. The MOHS issued a travel advisory on 13 March, restricting travel to selected countries and imposing mandatory quarantine measures for travellers arriving from countries with more than 50 COVID-19 cases. These were followed by restrictions on official travel abroad by government officers and public gatherings of more than 100 persons, and a lockdown of the country [44].

- Massive **community sensitisation and behaviour risk communication** using multiple channels and targeting various groups, including community leaders, took place.

Sierra Leone has been widely praised for learning from and applying the lessons from Ebola effectively [45]. The swift response to the pandemic was reflected in respondents' perceptions and is worthy of note as a good practice that could be replicated in future responses to health shocks. The combined lessons of the COVID and Ebola responses indicate, among other lessons, that during such health emergencies, the existence of strong emergency structures can contribute to health system resilience to health shocks. Building or strengthening such structures can be an important intervention to enhance effective emergency response.

Further, the MOHS had well-formulated **emergency response and health security plans**, most of which were developed following the end of the Ebola epidemic. For example, a well-articulated national health security plan and a pandemic influenza plan were developed before

the outbreak of COVID-19 (MOHS, 2018) [2]. There was also an emergency response plan with the provision for simulation exercises and the institutional memory to quickly activate a response. Our study found that approximately 70% of the respondents said the emergency response followed laid out plans.

This positive story comes out in the survey as most respondents said the government (76%) and the leadership of the MOHS (72%) did a good job handling the pandemic. The perceived early response, the declining cases at the time of the survey, and the continuity of service delivery compared to what took place during the Ebola epidemic are informative when seeking to understand why many respondents gave a favourable rating of the government and the MOHS's performance on the pandemic, despite some level of dissatisfaction with lapses in the response.

However, the survey results also show that there were systemic challenges that limited the effectiveness of the response. Despite the proactive measures of the government and MOHS leadership, the disease subsequently spread throughout the country.

Leadership and governance. The study results show that the main leadership and governance challenges were related to the management of the response, including decision-making and coordination. Of particular concern were the ineffective coordination of the emergency response institutions and health partners, inadequate supervision, and monitoring of the activities of the health workforce, as well as funding constraints, which affected the ability to adequately implement the various policies that were in place.

A few respondents pointed out that decisions were politically driven, rather than motivated by the health emergency or technical considerations. According to some respondents: *'the recruitment of non-technical personnel into professional positions to deal with the response as a result of political influence posed a challenge to the effectiveness of the health workforce*'. While we were unable to confirm this via secondary data, concerns on the politicisation of recruitment are not new in Sierra Leone, where political alternations often come with a change in recruitment patterns for many jobs, including in the health sector [56]. There have also been more general concerns expressed about the politicisation of the response: the arrest of Palo Conteh, the former head of the Ebola response under the previous government for treason, in connection with carrying a loaded gun into State House, was perceived with concern by members of the opposition All People's Congress [53]. The government's crackdown on subsequent protests over lockdown measures in Lunsar, an opposition stronghold in the north, as well as Tombo, in the outskirts of Freetown, was further seen in some quarters as a strike against the opposition, elements of which the president accused of being behind the violence [58].

Coordination was one area where respondents believed the lessons from the Ebola epidemic may not have been fully applied with the existence of parallel structures identified as a challenge to effectiveness. These findings are supported by Grieco and Yusuf (2020) and Babawo *et al*. (2020), who have both noted concerns with the effectiveness of coordination efforts [36, 53]. There are several coordinating bodies chaired by the MOHS: the Health Sector Coordinating Committee, chaired by the Minister; the Health Sector Steering Group, chaired by the Chief Medical Officer; and several technical working groups that provide forums for partner coordination. The Partner Liaison Officer and Service-Level Agreements also aim to ensure that partner activities are in sync with national health priorities [47, 57]. Nevertheless,

coordination arrangements were reported to be inadequate to meet the needs of emergencies. Overall, only two out of five (41%) respondents said coordination of the COVID-19 response had improved compared to Ebola. Only one out of three respondents said coordination of the response with partners was good. Less than 30% of the respondents said coordination of the COVID-19 pandemic response between the MOHS and NaCOVERC was good, with only 18% of senior staff confirming the same.

It is worth noting that respondents external to the MOHS had a more positive view of the extent of coordination between the MOHS and NaCOVERC than respondents who were employees of the ministry. The study results point to a level of dissatisfaction among MOHS staff about their involvement in the response. Many felt side-lined by the involvement of NaCOVERC and perceived the level of coordination with that body and the MOHS as weak, a finding that is supported by Babawo *et al*. [53]. Barr *et al*. (2019) have pointed to the fragmentation across the various structures of the health system in Sierra Leone as one of the challenges affecting 'the efficiency and coherence of health sector activities' [48, 57].

Health workforce. The most frequently mentioned challenges to the health workforce were related to health worker compensation, the adequacy of personnel, and training. These complaints were general to males and females. Respondents complained about the late payment of, or lack of, adequate health worker incentives (risk allowances), expressed dissatisfaction about the inadequate number of health personnel, the limited capacity-building and training opportunities for staff, as well as the poor salary and incentive schemes, including the lack of a health insurance policy for health workers. Less than half (46%) of respondents said there was adequate national human resource capacity to respond to the COVID-19 pandemic, with women more likely to express concerns than men. As women are frontline staff within hospitals, this higher concern is unsurprising.

Overall, there was a high level of perceived satisfaction among respondents about their level of involvement with the COVID-19 response, but a reasonable number of senior staff expressed dissatisfaction with their involvement. Four out of five respondents said they were adequately involved in the COVID-19 response, but one out of three senior staff felt they were side-lined. Additionally, junior staff had a less favourable judgement of the MOHS response to the COVID-19 pandemic than senior staff. Junior staff were less confident than senior staff that the MOHS leadership would implement COVID-19 deployment based on merit, as were women, indicating a perceived level of marginalisation among these groups.

These study findings are consistent with previous studies that report that health workforce challenges are a perennial problem in the Sierra Leone health system. For example, Wurie *et al*. (2016) reported that difficult working conditions, lack of training opportunities, lack of career progression, and limited financial incentives were among the key demotivating factors for the Sierra Leone health workforce pre-Ebola [16]. Witter *et al*. (2017) reported that conflict and health shocks have a profound physical, psychological, and socioeconomic effect on the health workforce, but these impacts are not adequately mitigated [24]. Our research also points to the importance of considering issues around recruitment and ensuring that processes are merit-based and transparent, and suggests that the inclusion of women and junior staff in the emergency response deserves serious consideration.

The respondents' perceptions about inadequate training and preparedness of the health workforce to respond to a surge in cases was corroborated by Dickson *et al*. (2020). In a rapid

assessment of the preparedness of health facilities to continue service delivery they found, among other things, that most hospitals had conducted COVID-19 training sessions and maintained written protocols to guide screening and procedures for the immediate isolation of suspected COVID-19 cases. However, only one Community Health Centre had a written protocol, three had conducted staff orientations, and two had isolation procedures [39].

Our study points to the need for adequate staffing, adequate and timely provision of incentives, sustained training, and an uninterrupted supply of medical logistics to make the health workforce more effective and to mitigate the stress associated with emergency response.

Community ownership and participation. The results of the COVID-19 perception survey show that community involvement was relatively high, and three out of four respondents (75%) said the MOHS's efforts to work with community leaders on the response were either very satisfactory or satisfactory. DiCOVERCs were operational in all districts, but the survey results show that they were 75% effective: less than ideal for an effective community response. The community was not prepared to manage a surge. There were limited numbers of contact tracers available at the district level to meet an increase in cases, and few community workers (who were mainly assigned to conduct contact tracing during the COVID-19 response) were trained.

Bedson *et al*. (2019) documented the lessons learned from the 2014–16 Ebola epidemic in Sierra Leone: they reported that integrating community engagement as a key pillar of epidemic preparedness and response (including routine service delivery during a health shock), and ensuring a supportive infrastructure for effective community involvement, were critical to an effective response and recovery [49]. The survey findings indicate that these critical lessons have yet to be fully applied. The results point to the need for greater community sensitisation, more inclusion of key stakeholders (such as community leaders and youth, among others), the enforcement of community-level by-laws, and greater decentralisation of the response, with more resources and tools provided at the community level.

These findings are supported by Grieco (2020), who reported that while the government had done a good job in developing COVID-related policies, it lacked the ability to implement such policies at community level [38]. For Grieco, this underscored the importance of using traditional leaders and other non-government actors who, he believes, play the critical role of 'implementing community sensitisation and border control, as their existing governance structure provides the infrastructure required for this'. He noted that did not receive much formal institutionalised support for this role and he recommended more deliberate strategies for their inclusion.

Entrenched unfavourable traditional and cultural beliefs and practices, and fake news about the pandemic, fostered denial of the existence of COVID-19 and discouraged service utilisation, resistance to mask-wearing, and fear of being tested for COVID-19 [36]. The survey results also indicate that messaging was less effective than expected, pointing to the need for improved risk communication to correct misconceptions and to '*reassure communities of their safety when they visit health facilities*'. This finding has been echoed by the MIT GOV/LAB, IGR, DSTI, and MoF-RDD (2020) study, which highlighted the need for critical messaging targeted at specific sub-populations for relevant information dissemination [50].

Service delivery. Ebola left the Sierra Leone health system completely shattered, but some interventions have taken place to rebuild the health system. The health sector has learned somewhat from its experience with Ebola and was able to put some measures in place to limit the effect of the COVID-19 pandemic. Indeed, three out of four respondents said the COVID-19 pandemic had less effect on service delivery compared to Ebola because the health system was better prepared for COVID-19 than it was for Ebola, and that the government, along with the MOHS, took proactive measures early in the pandemic that resulted in fewer cases and deaths. They pointed to the building of awareness around COVID-19 even before the outbreak occurred, as well as established structures that had been put in place. Most respondents felt that the health sector was able to continue functioning under COVID-19, with many people willing to visit healthcare facilities, but they pointed to serious challenges that undermined effective service delivery.

Supply chain management problems were the most serious challenges to the effective delivery of health services during the pandemic. Drugs, medical supplies (such as PPE), and laboratory supplies were frequently reported to be unavailable. Perceived risk or vulnerability to COVID-19 infection was reported to be high, particularly by junior staff of the MOHS: 81% of the junior staff were extremely or very worried about COVID-19 infection. This may be associated with the frequent reports of a lack of IPC materials in health facilities. Similarly, Kanu *et al*. (2021) reported that while healthcare workers overall felt knowledgeable about COVID-19, they were concerned about the lack of resources within healthcare institutions, including the availability of PPE to ensure their protection [31].

Among the most frequently mentioned problems associated with the response were inadequate temporary **facilities** for the treatment and isolation of suspected COVID-19 cases. These findings were corroborated by a UNFPA study that reported a lack of critical emergency response facilities and services, including triage and COVID-19 isolation facilities, at most PHUs [39]. There were also reported disruptions to the continuity of the referral system due to the reallocation of ambulance services to the COVID-19 response.

While not as severe as during the Ebola epidemic, health services **underutilisation** was reported because some people were not visiting health facilities for fear of contracting COVID-19. However, the evidence on this is mixed: Service utilisation appeared to drop in the initial days of the outbreak, partly due to temporary clinic closures, the effect of the lockdowns, health worker absenteeism, and reports that patients were being turned away from health facilities due to fear of COVID-19 transmission [36]. Buonsenso *et al*. (2021) noted that while there was an initial drop at the start of the outbreak, malaria diagnoses continued after sensitisation encouraging hospital attendance [41].

Dickson *et al*. (2020) did not note a decline in attendance patterns for women seeking antenatal, postnatal, and delivery care, although they noted that perhaps the data had not yet been captured at the time of their survey [39]. Grieco and Yusuf noted insufficient attention to issues around gender and social inclusion, including the reallocation of already limited resources away from issues of concern for women and girls and towards the COVID-eradication efforts [36]. Riley *et al*. (2020) reported that reduced access to service delivery due to health shocks could have implications for women's reproductive and maternal health, including unwanted pregnancies and maternal death [46].

The spread of the disease across the country despite the early intervention by the health sector was associated with weak point of entry monitoring, delays in resource mobilisation, poor quarantine enforcement, and limited laboratory testing capacity. Freetown-based respondents were more likely to mention weak point of entry monitoring and poor **quarantine** enforcement, which likely reflects the capital's hotspot status early in the outbreak, where incoming travellers were screened and forced to quarantine in government-paid facilities, including hotels, universities, and eventually quarantine homes. Specifically, quarantine or isolation homes were reported to be poorly managed. There was a shortage of water, food, and condiments, and delays in supplies [36]. According to one respondent: '*The food provided for people in quarantine places is not enough, facilities in quarantine homes are poor and there is poor monitoring of the homes*'.

Gender implications. The results of the study have been scrutinised for disparities between the genders. Although females account for nearly half of the MOHS workforce, there were more males than females in the COVID-19 response decision-making positions, which reflects the leadership structure of the ministry and the wider national gender imbalances. Females (69%) were significantly less likely than males (85%) to report that they were as adequately involved in the response as they would expect to be based on their roles. A lower proportion of females (54%) than males (60%) expressed confidence in the MOHS fairly selecting and deploying response staff. Women were less likely than men to state that the MOHS leadership or the government did an excellent or good job, or that coordination had improved when compared to Ebola. Women were also more likely to believe that appointments were politically motivated, and more likely to indicate more unfavourable responses regarding capacity, engagement with local leaders, and other questions that were raised, than men. These findings point to a perception among women of being marginalised or excluded in the COVID-19 response, and dissatisfaction with many aspects of the emergency response, when compared to men in similar positions of authority. This is despite women's greater vulnerability to COVID-19 (as was the case with Ebola), given their cultural and economic responsibilities [51]. The study findings reflect the inadequate inclusion of women within many sectors, and the ingrained gender disparities in Sierra Leone.

4 Conclusions

The findings of this study largely reflect perceptions of how the health sector responded to the COVID-19 pandemic, including coordination of stakeholders engaged in the responseThus, conclusions drawn on the overall quality of the COVID-19 response should be interpreted within the context of respondents' feelings, understanding, or opinions about how effectively the health sector responded to the health shock.

The study results indicate that the health sector faced some challenges but maintained many of its service delivery functions during the pandemic. The MOHS and the Government of Sierra Leone were regarded as doing a good job in handling the response but it was felt that a lot more could have been done to manage the response and ensure essential services were more responsive and adaptive to the health shock.

Health service delivery, human resources for health, and drugs, medical supplies, and technologies were the top three health system building blocks suggested for improvement to make the health sector response to COVID-19 more effective. Inadequate finance was seen as a cross-cutting issue affecting all building blocks. To develop a more resilient health system, the study results point to a need for a systems approach to health system strengthening that addresses identified gaps under all pillars, with priority given to service delivery, human resources for health, and drugs and medical supplies. The health system should have an appropriately trained and well-incentivised health workforce composed of clinicians, public health professions, and CHWs for the prevention, detection, mitigation, and response to public health emergencies and continuity of care. Although the overall supply chain and cold chain management have improved over recent years, with significant donor support, the study participants identified persistent supply chain management challenges that undermined the effective provision of essential health services and the overall response to the pandemic. Although it is too early to offer an overall assessment of the government's COVID-19 response, the perceptions of the respondents in this study on the effectiveness of the response point to a need for strong coordination by the MOHS and greater involvement of the professional health workforce. The coordination structures currently in place to ensure that all stakeholders are working in sync with the national response priorities need to be strengthened both at national and district levels, including active community participation. Furthermore, strong collaboration and commitment on the part of the government and partners to ensure the provision of adequate resources to support the implementation of health programmes, particularly service delivery, human resources management, and drugs and medical supplies, remain critical elements of overall health systems strengthening.

Good governance of the health sector would require paying more than lip service to even subtle forms of gender and other discrimination. Deliberate efforts to diversify the leadership of the health sector emergency response team to include more women in top management positions are strongly encouraged. The inclusion of women should not just be limited to the state response: women must also be central to community mobilisation and sensitisation efforts, and attention should be paid to other issues that women in the survey identified, namely limitations in the capacity of the health sector to respond to the outbreak, which reiterates the need for greater support to human resources for health. There is also a need to avoid politicisation of the response efforts.

4.1 Recommendations for future research

1. As the current study was mainly descriptive, more analytical studies are needed to examine the evidence on the effectiveness of the COVID-19 response. Understandably, many of the studies now available are rapid assessment studies of the response.
2. Some of the literature shows that the country has many existing policies relating to health emergencies response but most of them also express the need for future studies on the effectiveness of policy implementation.

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